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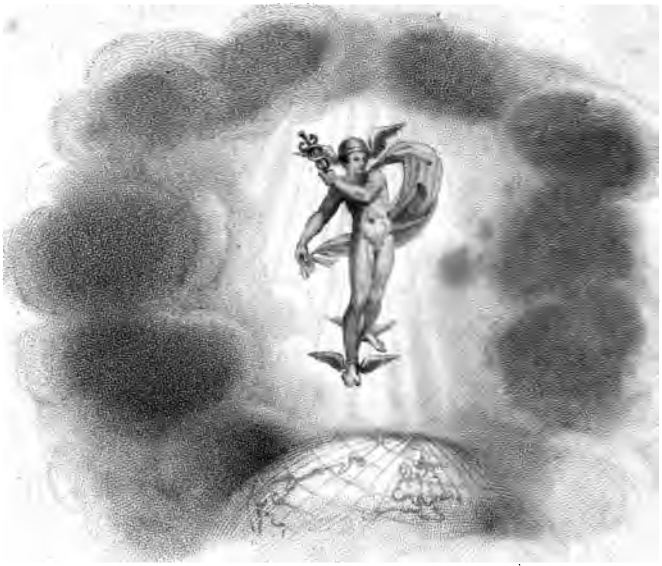


THE LONDON Journal of Arts and Sciences,

FOR 1823.

An Original Work,

EXHIBITING

The Progressive advancement of Practical Science

in the various branches of

ARTS, MANUFACTURES & AGRICULTURE.

VOL. VI.

LONDON:

Published by Sherwood, Jones & C.° Paternoster Row; & W. Newton, 66 Chancery Lane.

THE

LONDON JOURNAL

OF

Arts and Sciences;

CONTAINING

REPORTS OF ALL NEW PATENTS,

WITH A

DESCRIPTION OF THEIR RESPECTIVE PRINCIPLES AND PROPERTIES:

ALSO

Original Communications

ON SUBJECTS CONNECTED WITH

SCIENCE AND PHILOSOPHY;

PARTICULARLY SUCH AS EMBRACE THE MOST RECENT

INVENTIONS AND DISCOVERIES

IN

PRACTICAL MECHANICS.

BY W. NEWTON.

VOL. VI.

LONDON:

PUBLISHED BY SHERWOOD, JONES, & CO. PATERNOSTER ROW;
AND W. NEWTON, CHANCERY LANE.

1823.

SHACKELL AND ARROWSMITH, JOHNSON'S-COURT, FLEET-STREET.

TO THE PUBLIC.

In presenting the Sixth Volume of the London Journal of Arts and Sciences, its Proprietors beg to renew their acknowledgments for that liberal and increasing support which their work continues to receive.

A Journal devoted peculiarly to the *Mechanical Arts*, must, in the present state of our manufactures, be extensively useful. It is not descriptions of the most ingenious and important inventions, *alone*, that are calculated to satisfy the mechanical student, but a record of *every Invention* which has become the subject of Patent Right, and in this respect the London Journal of Arts and Sciences stands without a competitor.

From the commencement of the Work, a faithful account of *every new Patent Invention* has been given, with occasional remarks and references to similar designs; and also an extensive collection of such other projects as have been deemed worthy of public attention: the whole forming a valuable Magazine of the Mechanical Arts, by which both the practical and theoretic reader will derive instruction and amusement, and be enabled to appreciate the merits of ingenious inventions on the one hand, and the defects of unscientific hypothesis on the other.

From a variety of circumstances, it is impossible to report the Specifications of Patents, in the order that they are Inrolled; and in many cases, their immediate publication would be attended with inconvenience, by anticipating the inventors who are soliciting Patents in other countries. With these considerations in view, an early report of every invention is given, and in the present volume will be found the reports concluded of all the Specifications of Patents Inrolled during the year 1822.

The Proprietors of the London Journal of Arts and Sciences, conceiving it every way desirable in a Work like this, that a responsible Editor should be named, beg leave to announce that Mr. W. Newton, who furnished the mechanical part, only, of the Four First Volumes, has now the entire direction of the whole. From this arrangement, it is hoped that certain objectionable features which have occasionally presented themselves in the early Volumes, will no longer appear: and the Proprietors trust that a continuance of those unremitted exertions both in the literary and graphic departments, which have marked the progress of the Work, will continue to merit the approbation of a liberal and enlightened Public.

LIST OF PLATES IN VOL. VI.

PL.

Perkins's Improvements on Steam Engines

Fig: 1.

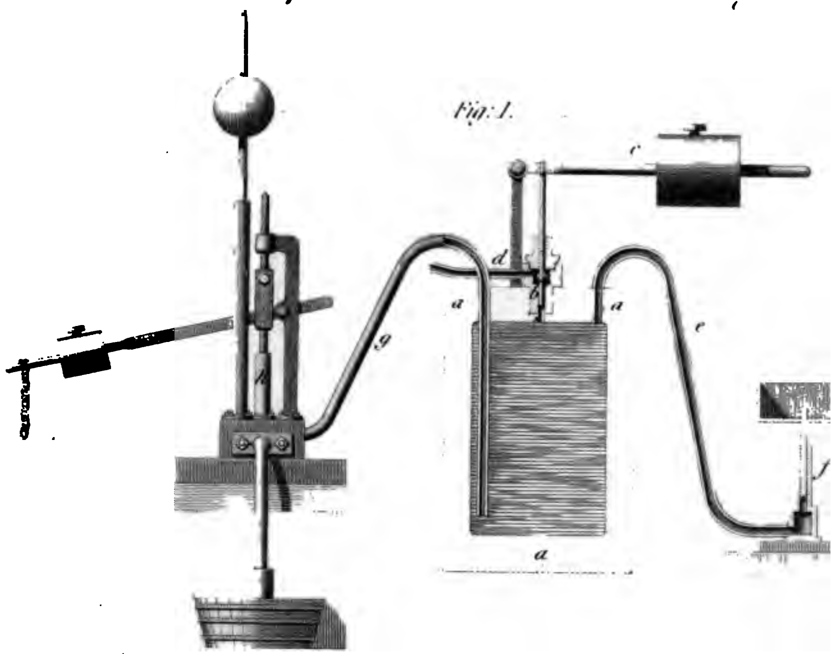


Fig: 2.

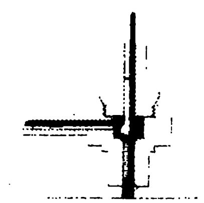
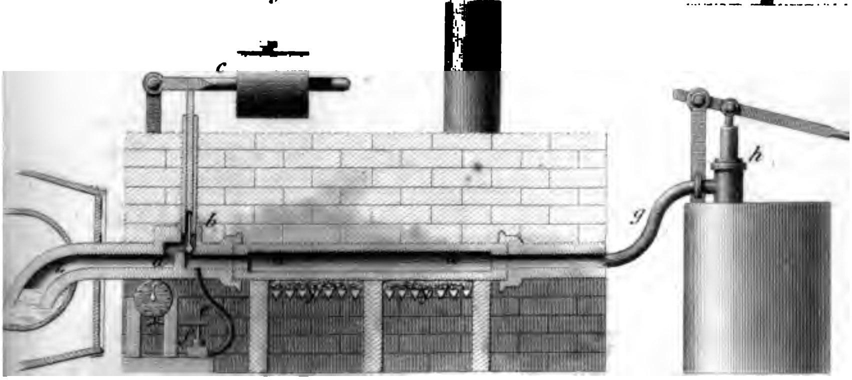


Fig: 3.



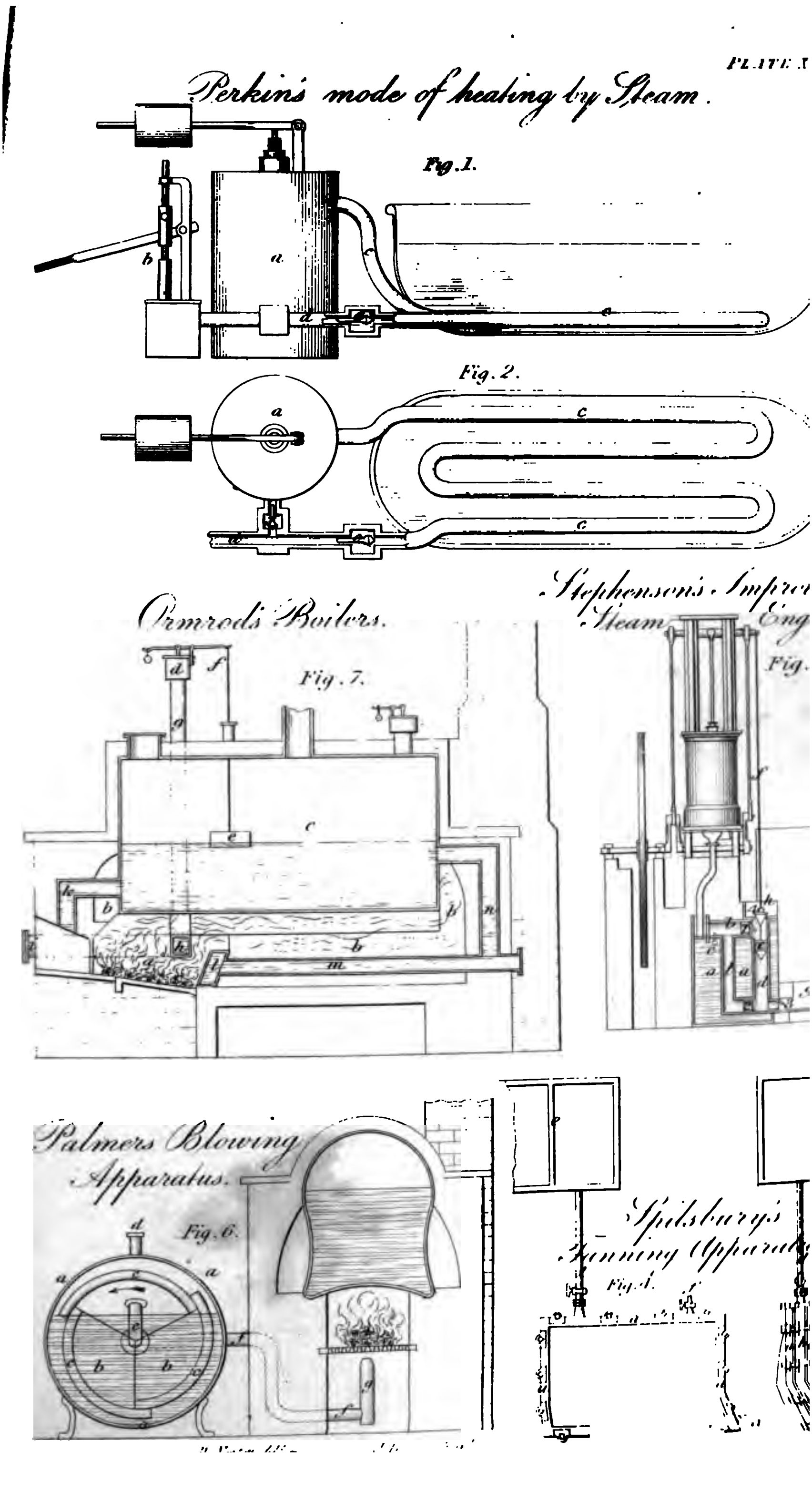


PLATE X
Perkin's mode of heating by Steam.
Fig. 1.
Fig. 2.
Ormrod's Boilers.
Fig. 7.
Steam
Palmers Blowing Apparatus.
Fig. 6.
Spilsbury's

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. XXXI.

Recent Patents.

To JACOB PERKINS, *late of Philadelphia, in the United States of America, but now of Fleet-street, in the City of London, Engineer; for Communications made to him by certain Foreigners residing Abroad; and Discoveries by himself, of an Invention of certain Improvements in Steam Engines.*

[Sealed, 10th December, 1822.]

IN the previous notices which we have given of these improvements, the general construction and operation of Mr. Perkins's engine have been described, as far as we were then enabled to collect his views and mode of operating. The specification is now before us, and we feel pleasure in submitting the patentee's own account of the invention, which will at once preclude any misconception on the part of the public, and lay the principles fully open to philosophical enquiry.

We have before said, that the various discoveries and

improvements which the new construction of steam-engines involve, are embraced under three distinct patents, the first of these we now proceed to explain.

The improvements are described as consisting in heating water, or other fluid, for the purpose of generating steam in vessels, kept perfectly full, and under pressure, which vessels are proposed to be substituted for the ordinary boilers of steam-engines, and are called GENERATORS; by this contrivance, a sufficient quantity of steam may be generated, for working an engine of any given power, with a much smaller quantity of fuel than would be necessary if the ordinary construction of boiler were employed. The improvements, likewise, extend to the causing of portions of such heated water, or other fluid, to escape from under the pressure, and to pass from the generator into the steam-pipe, where it instantly becomes steam, and proceeds directly to the cylinder, without the intervention of a steam-chamber. And further, the improvements embrace the mode whereby such heated water, or other fluid, is to be displaced from the generator, which is done by forcing a corresponding quantity of water into the generator, its uniform volume being maintained under a certain pressure. Lastly, the improvements contemplate the employment of the above principles, for the purpose of generating steam for the working steam-engines generally, whether such steam be employed to act through the steam-pipe directly upon the piston, or to supply a steam-chamber for the same purpose.

The patentee proceeds to say, "I do hereby describe a manner in which my said invention may be performed; which manner is the best I have hitherto discovered, or are at this time in possession of, or informed of, and which is ascertained by the following description thereof, reference being had to the drawings."

"Plate I. fig. 1, represents the general construction of the apparatus; *a, a, a*, is the generator shewn in section. It is a strong cylindrical vessel, made of metal, about three inches thick in every part, which may be a guide to the comparative dimensions of the other parts of the apparatus. This vessel is to be filled with water, and heated by a furnace circumscribing it. On the top of the generator there is an escape-valve *b*, pressed down by the weighted lever *c*, the pressure being adjustable by the shifting of the weight. The valve opens to the steam-pipe *d*, which is to be supposed as proceeding to the working piston of the engine. The lateral pipe *e*, extending from the generator, is merely for the purpose of safety; and at the end of it there is an apparatus *f*, attached, by which the pressure is indicated; *g*, is the feeding or injecting pipe, leading from the forcing pump *h*, which may be worked by a connection to the moving part of the engine.

"In order to generate steam, the vessel *a*, must be filled with water, or other fluid or fluids, from the pump *h*, and heated by a furnace, or otherwise; the steam, or escape-valve *b*, being loaded by means of a weight, with a pressure greater than the expansive force of the steam, to be generated from such water, or other fluid or fluids, at the time of its generation. When the water, or other fluid or fluids, in the generator, has attained the necessary degree of heat, say from 400 to 500 degrees of Fahrenheit, more or less, an additional quantity of water, or other fluid or fluids, is pumped into the generator, sufficient to force out a portion of that already heated in the generator from under the weighted-valve *b*, into the steam-pipe *d*, where it instantly becomes steam."

An enlarged representation of the valve, and its seat, is shewn in the section, fig. 2. The valve is a spherical bulb, falling into a concave seat, in the lower part of the square

chamber; the upper part of the valve is a cylindrical rod, upon the top of which the weight of the pressing-lever is exerted; the lower part of the valve is a triangular stem, sliding up and down in the cylindrical passage. When the additional quantity of water is injected into the generator, by means of the force-pump as described, the bulb of the valve rises from its seat, and a corresponding quantity of heated water passes up between the cylindrical passage and the sides of the triangular stem, into the square chamber, where the pressure, no longer operating upon that portion of the water, it immediately becomes steam, and passes forward through the steam-pipe to the working cylinder.

"In order that the operation may be renewed, and continued regularly, I make use of an adjusting weight on the handle of the pump *i*, which is a small single-stroke forcing-pump, with a weight performing the office of an air-vessel. At the end of the pump-handle is a chain, which I connect with a simple crank movement, and thus, by a corresponding adjustment between the weighted steam, or escape-valve *b*, the throttle-valve, (which is not thought necessary to shew in this drawing) and the weight on the handle of the pump *i*, a certain quantity of water is forced into the generator at every stroke of the pump, and a corresponding quantity forced from under the weighted valve *b*, to become steam."

These principles may be modified and applied to the boilers of ordinary steam-engines, a mode of adopting which is shewn in fig. 3. The invention is here represented under another form, and differently employed, being a plan for heating the water of an ordinary engine-boiler, with a view, principally, to save fuel: *z*, is a tube communicating with the ordinary steam-boiler; *a*, *a*, is the generator, a cylindrical metallic vessel, of which there may be several connected

tion, and with a very important saving in the quantity of fuel, compared to what would be consumed, to effect the same purpose, by any other plans heretofore adopted."

The specification concludes by stating the particular claims and objects of the present patent, which are expressed as follows: "Now whereas the materials of which my said improvements are constructed, and the exact proportions of the relative parts of my said improvements are not subjects for which I hereby claim exclusive privilege, though I have described those materials and proportions which I have found most useful; neither do I hereby claim exclusive privilege for the peculiar forms of the various mechanical agents which I employ, but only for a combination of such and the like agents as will produce the said improvements, the nature of which is hereinbefore declared, and for which a claim to exclusive privilege is hereinafter made. *And whereas*, I have only represented in my said drawings annexed, such parts of a steam-engine as comprise my said improvements, the various modes of applying such said improvements, by means of the steam-pipe, being too well known to require particular description here. *And whereas* my said generator may be heated by a variety of known furnaces, therefore I have not described any one in particular, but the one I have used and found to be the best is one of the cupola kind, fed by a blast. *And whereas*, I have described in my said drawing, fig. 1, a safety-pipe and indicator, and a forcing-pump, neither of which are in themselves new, but which apparatuses, or similar ones, constitute a combination necessary to my said improvements, and are inserted as such; I therefore hereby claim exclusive privilege for the following improvements only: *that is to say, first*—for heating water or other fluid or fluids, for the purpose of generating steam for steam-engines, in a vessel or vessels, kept (during such process of

small quantity of the extract of Brazil wood, and a few drops of pure ox gall may be added, which will produce a bright orange colour, suitable for the devices or lines on the *front* of the check, because the ink writing will be very perceptible upon such tint. For the *backs* of the checks, a colour is proposed to be used, extracted from logwood, which is made by boiling any quantity of chips of logwood in water, and evaporating the extract until it is about the consistency of olive oil; when, by the addition of a few drops of ox gall, the extract will flow freely into the paper, by which lines, or other devices, may be represented by drawing; and should acid, or other chemicals, be employed to extract the ink writing on the face of the check, the purple tinge of the vegetable extract will instantly be changed to a dull orange-colour, and thereby shew the attempt which has been made to alter the value of the check.

When it is desirable to employ the vegetable colour in the same manner as printing-ink, a composition is to be made of the following ingredients, moistened with a preparation of logwood without the ox gall. One pound of pure white chalk, one pound of castile soap, and one pound of powdered turmeric, are to be mixed together, and ground upon a marble slab, adding as much of the extract of logwood as will give it the required consistency. Any of the vegetable colours, commonly used as chemical tests, if employed as above, will produce the same advantageous effects. A variety of liquids may be added to the vegetable matters, for the purpose of obtaining a colouring extract: such, for instance, as alcohol, brandy, or other spirits; and a number of other ingredients, besides those abovementioned, may be employed, to give the colours a consistency, as treacle, soap, or flake white, either separately or mixed, in such proportions as circumstances may require.

Inrolled, June, 1823.

To JOHN BOLD, *of West-street, Nelson-street, Long-lane, Bermondsey, Printer, for certain Improvements in Printing.*

[Sealed, 4th July, 1822.]

THESE improvements are the combination of a multitude of parts, constituting a printing machine, which, as described in the specification, appears to be so extremely complex, and is so unadvisedly incumbered with several hundred letters and figures of reference, that we fear our best efforts will present our readers with but an imperfect description of the patentee's invention.

Plate II. fig. 1, is a side view of the machine; consisting of a fixed frame or standard, having two rails, *a*, *a*, *a*, upon which the rollers of a sliding-frame, carrying the presses and inking apparatus, are made to traverse to and fro, by the agency of a winch, which actuates certain axles, toothed wheels, pinions, pullies, wedges, screws, levers and chains, and by those means effects the operation of printing.

The rail *a*, *a*, *a*, (of which there is one on each side) is supported upon standards, properly braced together, for the purpose of rendering the bearing firm; the upper edges of these rails are rendered perfectly flat, in order that the wheels of the carriage *b*, *b*, may traverse with as little friction as possible. The tables for holding the forms of type, are of cast-iron, secured to the standard, and situated as shewn by dots at *c c*, *c c*. There are two [illegible] ders *d*, *d*, suspended by their axles, and [illegible] mer blocks, with upper and under screws [illegible] height. These cylinders may be made of [illegible] or cast hollow, and filled with lead, their [illegible] covered with blanketing as usual; *e*, *e*, *e*, [illegible] troughs, with ductors and feeding [illegible] and at the ends of the tables, *f*, *f*, [illegible]

rollers, above which are small wooden rollers for distributing the ink equally upon the surfaces of the elastic inking-rollers.

Rotatory motion being given to the axle of the fly-wheel *g*, by means of the winch; the spur-wheel *h*, is made to revolve, which carries an endless chain that passes over another spur-wheel behind *i*, and upon the same axle; the spur-wheel *i*, also, drives another endless chain, which passes over the wheel *k*; and to one of the links of this last-mentioned chain is attached the connecting rod *l*. This rod is affixed by a joint to the carriage *b*, *b*, and, therefore, as the rod is drawn backward and forward by the revolution of the spur-wheel and endless chain, the carriage *b*, *b*, is made to traverse to and fro upon the rails of the standard *a*, *a*. To the sides of the tables are fixed the bars *m*, *m*, with the racks, and upon the axles of the pressing-cylinders are toothed wheels taking into these racks, by which means, as the carriage traverses, the pressing-cylinders are made to revolve.

Upon the axle of *g*, there is a bevelled toothed-wheel, which takes into a similar wheel *n*, upon the shaft *o*, *o*, and consequently, when the machinery is in action as above described, the shaft *o*, *o*, revolves also. On this shaft there are three endless screws, *p*, *p*, *p*, each of which take into toothed-wheels upon the axles of the feeding-rollers at *e*, *e*, *e*; and by that means cause the feeding rollers to revolve. In order to bring the surfaces of these feeders in contact with the elastic inking-rollers, there are small inclined planes, fixed on the insides of the carriages, which, passing under the pivots of the feeders, raise them up so as to touch the inking-rollers, and thereby communicate the ink every time that they may pass over: *q*, is a sliding-bar, connected to the carriage, of which there are one on each side, with inclined planes for the purpose of alternately raising and depressing

the axles of the inking rollers, by which means those rollers that have just received their ink from the feeders, spread it upon the distributing rollers above, and those which have had theirs distributed, descend and roll over the form of types, for the purpose of supplying them with ink: *r*, *r*, are stops at the ends of the racks, by which the race of the carriage is limited. The distributing rollers are made to revolve by means of toothed-wheels upon their axles, which are actuated by racks fixed on the sliding frame, and are made to slide laterally by threads on their axles working in nuts, which causes the ink to be distributed more equally.

Arms, *s*, *s*, extend from the ends of the table, for the purpose of supporting what are termed horses, *t*, *t*, intended to hold the supply of paper for printing; these horses are capable of being raised or lowered by means of racks, and are thereby adjusted according to the varying height required, as the paper is worked off: *v*, *v*, are delivering boards, supported on brackets, and turning upon pivots; on to these boards, and over the rollers *w*, separate sheets of paper are brought and registered by lines marked thereon. The board is then let fall, and the sheet of paper suffered to hang from the rollor *w*, until its edge is taken hold of by a small roller, and held against the periphery of the pressing cylinder. As this part of the operation is to be effected at certain periods, the contrivance for [illegible] the sheet of paper is regulated by a vibrating [illegible] which, as the carriage passes to and fro, causes [illegible] to slide backward and forward, and, by means [illegible] at the extremities of this bar, taking into [illegible] upon the ends of the roller *w*, the sheets of [illegible] the proper times carried down to the [illegible] and are there held by guide rollers [illegible] rotatory progress of the pressing [illegible]

paper are laid upon the surface of the types, and after receiving their impression, are conducted off, and raised from the tapes by an open frame or grating z, from whence they are taken by hand, and deposited in a heap at a distance from the engine.

Inrolled, January, 1823.

To JOHN JEKYLL, *of Roundhill House, in the Parish of Wincanton, in the County of Somerset, Captain in the Royal Navy, for certain Improvements in Steam or Vapour Baths; to render the same more portable and convenient than those in present use.*

(Sealed, 9th November, 1822.)

THE contrivance proposed by the patentee, for conducting steam from a boiler, to any part of the human body, consists in a peculiarly constructed vessel through which the steam is to pass, and also in certain appendages employed therewith. Plate II. fig. 2, is a section of this vessel into which steam is conducted from a boiler through a moveable pipe, part of the pipe being seen connected. The boiler is placed in any convenient situation, as upon the chamber fire, or elsewhere, and the steam allowed to pass through an aperture in the lid, and along the pipe to the entrance of the steam-vessel at a; having occupied the lower part of this vessel b, the steam ascends through a grating or false bottom c, c, perforated with holes. In the upper part of this vessel, d, d, a quantity of herbs or other odoriferous matters may be placed, from which the steam in its passage will effect an extract, and thereby impregnate the vapour with the volatile parts of the herbs, and which may be an extremely beneficial mode of administering medicine externally to the system.

The steam, or other vapour, escapes through the space between the vessel and its cover *e*, *e*, the discharge of which may be regulated by raising or lowering the lid. This lid it will be seen is supported by a centre pin *f*, and rises and falls by means of the screw which circumscribes it. The top surface of the lid is graduated with radiant divisions, and numbered, by which means, as the lid is turned the width of the opening through which the steam passes, and also the quantity allowed to escape, may be regulated to the most minute exactness. On the side of the vessel there is a cock, *g*, to which a flexible pipe is proposed to be attached, and when circumstances require it, the steam or vapour is allowed to pass through this cock and pipe, and may be thereby directed to any particular limb or part of the body.

The boiler above-mentioned is enclosed, with a lid, which is proposed to be fastened down by means of three or more buttons, so as to be easily removed if required. In the top of this lid there is an aperture, as before described, for the introduction of the steam-pipe; and there is also a conical valve introduced in the lid by which the steam may escape whenever its pressure within the boiler becomes too great. A valve or stop-cock is likewise introduced into the steam-pipe *a*, for the purpose of shutting off the steam from the vessel when required; this valve is formed by a flat circular plate or disc of metal, fitting exactly the internal diameter of the pipe.

In employing the above apparatus, the person is placed in a chair, the seat of which shall be [illegible] with holes, and under the chair the steam [illegible] situated; a close garment is to cover the [illegible] part of the body as is intended to be [illegible] the vapour; sticks may be introduced [illegible] supporting the close garment, so a [illegible]

must be lengthened as represented by dots, and a square formed within.

The patentee states, "I am well aware that attempts have been made in this and other countries, to make cocks of a somewhat similar nature with these, but I believe without the desired success. And I particularly claim as my improvements, the modes of securing the cup *b* in its place, the widening of the upright tube at *c*, the application of Indian rubber in place of cork, and the manner of making the cock into a lock-cock."

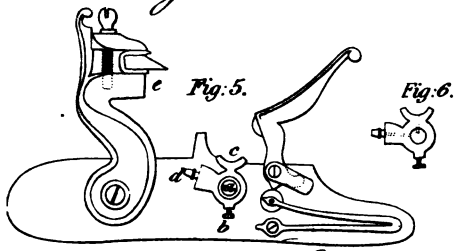
Inrolled, January, 1823.

To Sampson Davis, *of Upper East Smithfield, Middlesex, Gun-lock Maker, for his Improvements upon the Lock for Guns and other Fire-Arms, which enables the same Lock to be used upon the percussion Principle, or with Gunpowder, without changing the Lock or Hammer.*

[Sealed, 12th February, 1822.]

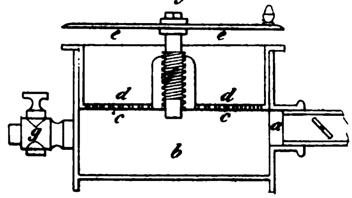
This invention is a revolving piece to be attached to the lock, containing two touch-holes; the one enabling the piece to be fired by a detonating composition, the other by ordinary gunpowder. Plate II. fig. 5, shews a gun-lock, with this improvement; fig. 6, the moveable touch-hole piece detached. From the side of the lock-plate, a cylindrical plug extends, which is perforated on the top, and from thence a channel at right angles leads into the barrel; the moveable touch-hole piece is made to turn upon this plug, to which it is attached by a screw *a*, and made fast in a position, suited either to the firing by flint and steel, or by percussion.

Davis's Improved Gun Cock.



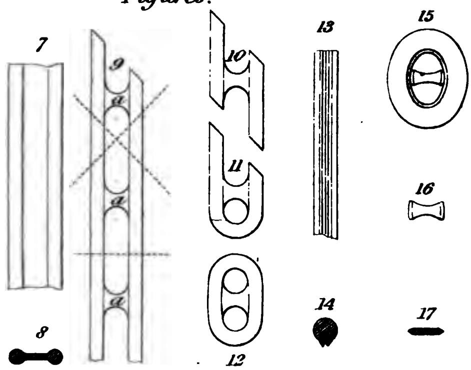
Jekyll's Vapour Bath.

Fig: 2.



Acraman & Pipers Chains.

Figures.



Dixon's Imp.d Cocks.

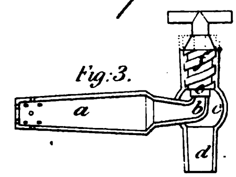
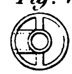
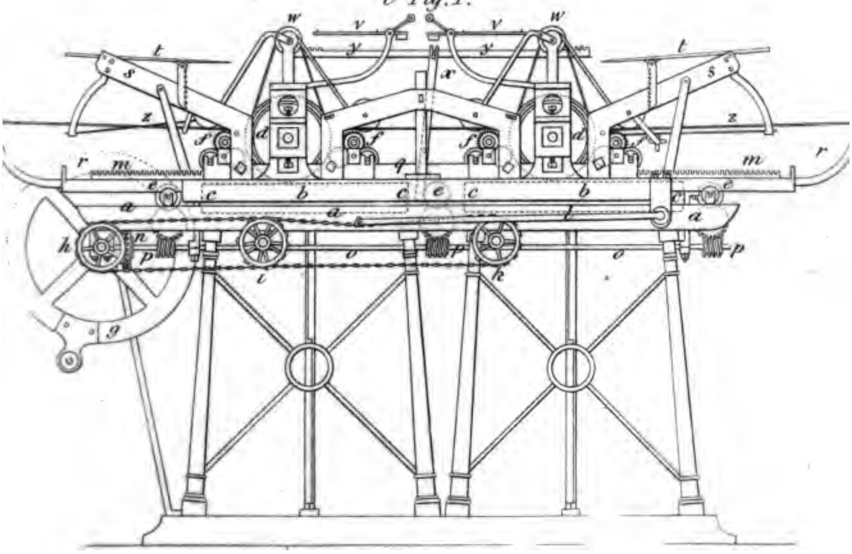


Fig:4.



Bolds' Printing Apparatus.

Fig:1.



W. Newton del.t

J. Bacon

The gun-lock, when the touch-hole piece is held in the position seen at fig. 5, by the screw *b*, is calculated to fire by the flint and hammer. The gunpowder for priming is to be deposited in the recess or pan *c*, which, when the hammer is shut down, will be secured from damp, and when the cock goes off the flint will strike the hammer up, and inflate the gunpowder by sparks as usual. When the gun is to be discharged by percussion, the position of the touch-hole piece must be shifted, and made fast with the nipple *d*, turned up so that the flat part of the cock *e*, may strike upon it, and discharge the detonating composition, previously deposited in the nipple, by percussion.

The patentee does not claim any improvement in the detonating composition to be employed for discharging guns and other fire-arms by percussion, nor in the modes of employing such composition; neither does he claim any improvement in the mechanism of a gun-lock applicable to either of the modes of firing, that is by flint or by percussion, but he claims the combination of the two plans in one lock, by means of the moveable touch-hole piece, and which need not be detached from the lock in changing its adaptation from one to another.

Inrolled, April, 1822.

To Daniel Wade Acraman, *of Bristol, Iron Manufacturer, and* William Piper, *of the Cookley Iron Works, Worcestershire, Iron Manufacturer, for certain Improvements in the Preparation of Iron, for the better manufacture of Chains and Cables.*

[Sealed 12th April, 1823.]

The improvements proposed under the patent, consists in a peculiar manner of preparing bars for the more eligible

To Robert Brettell Bate, *of the Poultry, London, Optician, for certain Improvements on Hydrometers and Saccharometers.*

[Sealed 21st March, 1822.]

These instruments are formed by a hollow egg-shaped bulb, with a short stem at bottom, having a balance weight to keep the bulb erect when immersed into fluid, and a long graduated stem on the top of the bulb, by means of which, according to the depth that the bulb sinks into the fluid, the specific gravity is denoted. The patentee states, that hydrometers and saccharometers may be made with stems long enough to indicate all the necessary variations of specific, for most purposes to which such instruments are applied; but the length of such stems would preclude the instruments from being portable. It has therefore been found desirable to add weights of certain value to the lower stem, in order to sink the bulb, and consequently to have different graduated scales upon the upper stem, referring to those weights, and a table, or sliding rule, to reduce the observations to its value, which process is extremely troublesome, and calculated to create error.

The present invention consists in constructing a certain set of poises to be attached to the lower stem, of which one may be substituted in the place of the other, as the variations of the specific gravities of different fluids may require, the poises being respectively contrived to sink the bulb, so that one scale of graduation may answer to all the poises.

The scale upon the upper stem, and the different poises, are designed to shew the weight of the fluid in which the instrument is immersed, as compared to water or any other given standard, to a very great exactness; the lowest point

upon the scale with the first poise, answering to the highest point upon the scale with the second poise, and so on, the scale indicating the parts of the different ranges between the highest and lowest points of the scale to which the several poise weights are suited.

The patentee states: "In order to identify and distinguish my invention, and thereby prevent, as far as I am able, any infringement upon this patent, I hereby declare that it consists solely in the peculiar construction and combination of my weights or poises, by means of which peculiar construction I am enabled to alter their bulk and weight at pleasure, and consequently so to accommodate or adjust each poise to the permanent part of my instrument, that when either is combined with it in the way I have described, a true indication will be given of the specific gravity of any corresponding liquid in which the instrument shall be immersed by the divisions of the stem at which it floats, and the number of the poise employed."

Inrolled, May, 1822.

Original Communications.

To the Editor of the London Journal, &c.

Sir,

A report has lately been made to the Home Secretary of State, by Sir William Congreve, on the subject of gas-lighting and gas-works; and from the grave and important manner in which the circumstances mentioned in that report are stated, seem much calculated to create general public uneasiness, and unnecessary alarm.

It appears from a number of experiments made at Woolwich, by Sir William, on the comparative explosable force

of certain portions of carburretted hydrogen gas and common air, with certain portions of gunpowder, he is enabled to say, that one cubic foot of the above mixture is, in its explosive power, equal to that of five ounces of gunpowder.

From the data furnished by the experiments alluded to, Sir William states, that 288 feet of gaseous mixture, is equal, in explosive power, to one barrel of gunpowder, that a volume of 15,000 feet is equal to 52 barrels of gunpowder, and that 15 gasometers, containing the explosive mixture, each containing 15,000 feet, would be equal to 783 barrels of gunpowder; an explosive power, certainly of a most alarming nature, and certainly, if these deductions from experiments could be for one moment seriously contemplated, would fully justify legislative interference in the regulation of gas machinery, which appears to be the principal object of the report.

There are numerous cases where it is extremely unreasonable to presume that a thing is probable because it may be proved to be possible. What would become of our great manufactories, our commerce, or our steam-boats, if steam-boilers were to be made a matter of continued and vexatious legislative interference; the best security against danger in this respect is, in the local interest of the party immediately concerned, and not in the arbitrary mandate of a PUBLIC INSPECTOR.

I do not mean to question the results of the experiments made by Sir W. Congreve, at Woolwich. I take it for granted that they were correct; but it is well known to experimentalists, that theory will often give one result, and practice another. This I will endeavour to show has been somewhat the case on the subject before us, and hope that those who are disposed to feel alarm at the statements contained in Sir William's report, will recollect that the

business of gas making has now the advantage of nearly 20 years experience; that it has overcome a mass of ignorance, prejudice, and persecution; and if there must be legislative regulations, the successful perseverance and enormous losses of gas companies, peculiarly claim the indulgent consideration of the government.

Presuming that the explosive force of coal-gas is as great as described by Sir William, must it not strike every thinking mind that practical experience of the dangers attending explosion is decidedly against him: in spite of all the want of knowledge which has attended the distilling of coal-gas, during its infantine career, and the thousands of ignorant and careless persons who have had a partial controul over it, Sir William has only recorded one single instance of serious explosion, and that merely forced out the sash windows of the house where it occurred.

Sir William appears to have forgotten an accident of a much more extensive nature than the one he describes; I mean the explosion at the Custom House: repairing of the damage done on that occasion cost several hundred pounds. I am surprised that he did not mention this explosion; perhaps it might not occur to his mind, or the facts would not, I suppose, suit the object of his report; for the effects of that explosion, and others which I have seen and heard of, are decidedly against the conclusion which is to be drawn from his report of the comparative strength of gas and gunpowder. The particulars of the accident which occurred at the Custom House I will briefly relate.

The flag pavement at one of the principal entrances to the Custom House were laid on low walls of brickwork, leaving a considerable hollow space beneath the stones between the brick walls; a service-pipe, intended to supply some burners in the hall, was introduced through a part of the before-mentioned recess; at the end of this pipe was

placed what is termed a swan-necked syphon, which, by some unaccounted-for neglect was left open, and remained so the whole of one day and two nights: during this time the effluvia of the gas became highly offensive, and persons were employed to discover the cause; a small opening was made in the pavement, and upon the application of a lighted candle to the neighbourhood of the pipe, the whole of the gaseous mixture, which had completely filled the hollow space beneath the stones, exploded with a loud report.

Now here was an explosion in its most mischievous form, being, with the exception of the small opening before-mentioned, completely and strongly confined by a thick stone pavement, of the best sort, neatly fitted and firmly cemented. It is not in my power to say what number of cubic feet of the mixture exploded, but from the best of my recollection, it could not have been much less than the number which Sir William states to be equal in effect to the explosion of a barrel of gunpowder.

Now so far from this explosion producing any thing like the effects of gunpowder, the damage, on the contrary, was surprisingly local; it merely forced up and broke the stones under which it exploded, scarcely removing one from its original situation; it also injured the stone stairs, and on the whole exhibited proofs of great force, but extremely limited in its action compared with the wide-spreading destruction which always attends an explosion of gunpowder. Several persons were on the spot, who were uninjured, with the exception of the man who fired the gas; he received a trifling wound or two on the face; and, what is almost unaccountable on that occasion, there was not one window broken.

Now, having given an account of a gas-explosion, under circumstances so peculiarly calculated to exhibit its destructive effects, I will mention one of gunpowder, of the effects of which I was also an eye witness.

About nine or ten years back there was a man of the name of Lachellas, living in John Street, Spitalfields, a hair-dresser, who was in the habit of manufacturing fire-works, prior to the 5th of November. In this man's house a barrel of gunpowder was accidentally exploded; the whole of the house and family were destroyed; the two adjoining nearly so; almost all the windows in the neighbourhood broken, and in Brown's Lane, a considerable way round the corner of the street, large sashes, such as are used in weavers' shops, were absolutely dashed in altogether.

Now I leave those who are more scientific than myself to reconcile, if they can, the foregoing facts with the alarming statements made in the report of Sir William Congreve, and I do hope that those who may contemplate these matters, with a view to legislative interference, will candidly and patiently investigate, and impartially determine, without suffering their minds to be led from the truth by those who may possibly have an interest in creating unjust alarm.

A large portion of Sir William's report consists in calculations of the quantity of gas and coke produced by a chaldron of coals; the number of cubic feet of gas consumed by a burner per hour, and a variety of other matters connected with the making of coal-gas, almost all of which have been stated over and over again in all the periodical scientific works which have been published for several years back.

But there is one circumstance which I believe is perfectly novel, to avoid the unpleasant effects of trifling leaks in new laid pipes. Sir William recommends that they be laid in clay firmly rammed down: now, not to mention the enormous expence, the thing itself would be useless; does Sir William suppose that clay will hold that subtile fluid which penetrated the wooden water-pipes of Liverpool, and absolutely tainted the water? I say, the thing is unneces-

sary; it is notorious that oxydation soon takes place, and the leaks completely close themselves.

Sir William very sagaciously hints at the propriety of regulating the price of gas: I apprehend Sir William has been calculating the profits from the absurd statement to be found in some of the Monthly Magazines; among other articles mentioned in these statements, will be found coal-tar at about 2s. or 2s. 6d. per gallon, while the real price at which it is now selling at the city gas-works, is only one penny per gallon: so much for this article of profit; and the ammonia, I dare say, may be had almost for fetching away.

Sir William, in his report, recommends that no gasometer in future shall be made capable of holding more than 6000 feet of gas; and that the proprietors of the capacious gasometers now in use be compelled to permit no more than 6000 feet to enter; and that they shall not be nearer each other than forty feet; if nearer, that enormous mounds of brickwork be erected between them; and that no gasometer shall be erected within 50 or 100 yards of any dwelling house. Surely Sir William, who talks with such indifference of regulations which would destroy property to an enormous amount, cannot be insensible that there are persons who will scarcely give him credit for disinterested sincerity in this business. He, after the various extensive gas-works have been erected in the metropolis and elsewhere, and carried on for years, suddenly finds that gas is deadly explosive; that gasometers ought not to contain more than 6000 feet capacity, and that the government ought to appoint some PERSON to be general inspector of gas-works for the whole kingdom.

Yours, &c. Z.

Report of Thomas Telford, Esq. *on the Effects which will be produced on the River Thames by the rebuilding of London Bridge.*

[We are favoured with a copy of the following document from Mr. Telford, relative to the River Thames, and the effects which would be produced upon its banks and bridges, in the event of erecting a New London Bridge; the particulars of which are so extremely interesting, that we hasten to lay them before our readers.]

In consequence of the authority given me by the Resolution of the Committee for letting the Bridge-House Estates, dated the 7th of March last, I immediately took measures to get an accurate Survey made of the River, its banks and appendages. For this purpose I employed two persons experienced in making similar Surveys, *viz.* one for the district from London Bridge to Putney and the other from Putney to Teddington Lock; and in order to insure accuracy and proper connexion and uniformity, I caused one of my own assistants, also accustomed to river surveys, to carry levels from London Bridge to Teddington Lock, and I have myself superintended and occasionally inspected the proceedings: I have also received the tidal observations made at different times at several stations upon the river.

From these operations and documents, maps or plans, and longitudinal and cross sections, have been delineated, and the results drawn from which I shall have to state in the progress of this Report. The limited time which has been allotted for making so extensive, complicated, and important a Survey, has hitherto prevented me from rendering it so perfect as I could wish; but having now ascertained the principal facts, I no longer delay furnishing the Committee with a brief Report respecting the principal

matters, and will afterwards continue to make sundry other useful additions to the Survey.

In order to proceed with regularity, I shall adopt the following arrangement in tracing the effects which would be produced to the westward, and also to the eastward of London Bridge, if the present edifice, which constitutes a dam of from 1 foot 1 inch to 5 feet 7 inches, or 4 feet 4 inches on an average, were removed, and in its stead a new Bridge, with comparatively little obstruction, were substituted; all as required by the before-mentioned Resolution of the 7th of March.

1. Observations on the comparative state of high water, founded on the surveys and levels lately taken, and the tidal observations made in 1820, 1822, and 1823; and further, what is likely to take place if London Bridge be removed.

2dly. Similar observations as regards the state of low water.

3dly. As to the effects which the aforesaid changes are likely to produce upon the navigation, bridges, banks, wharfs, shores, and adjacent properties.

First, As to the state of the River at high water.

It appears from the table of observations of the height of the tides at the several bridges in 1820 and 1822, that the average fall through London Bridge at high water was from 8 to 13 inches; that by those of 1823, since the removal of the water-works, the fall, instead of 8 inches, is now only from 3 to 4 inches. I think, therefore, it is fair to conclude, that, with a still less obstructed water-way, there will be little or no fall at high water, and that, hereafter, high tides in the western parts of the city will even in calm weather be at least on the same level as below bridge.

I find that the level of the wharfs below bridge is from 2½ to 4 feet above the Trinity datum, and that those of 2½ feet are occasionally flooded. The average level of the wharfs above bridge is from 1½ to 2 feet above the Trinity datum; and the extraordinary flood of 1821, which rose at Teddington 7 feet, rose at Putney only 2 feet, and at Lambeth 1 foot 11 inches above the said datum.

Therefore, it appears, that there is more reason at present to dread the elevation arising from the tide below bridge, than from floods above; and that the floods of the Thames are not sufficient, in the present state of things, to fill the lagoon or pond above the narrows of the bridge to the height which some of the tides do below, and which, there is reason to believe, they also would above, were the channel unobstructed.

But it may be supposed, that the quantity of tide coming in at the Nore being given, the additional space provided for it by opening the upper part of the River will prevent it from rising so high as it now does near the bridge, and that, therefore, not only is there a probability of no greater elevation occurring there than at present, but that it will, in similar circumstances, be lower below bridge—consequently, that no danger can arise above.

To this I reply, that when it is high water at the Nore, we have it within two hours, high water at London Bridge, at the distance of forty miles; so that the high water passes up at the rate of twenty miles per hour; so much more rapidly than any known velocity of the River, that its effects are not to be accounted for by the flowing of the current merely, as may be supposed the case in filling up the pond to Teddington through the arches of London Bridge.

In this last case we have levelled along the banks of the River, and find, after correcting the marks expressing

Trinity datum, that the lowest surface of high water is between Putney and Kew; that it rises about 1 foot to Teddington, and nearly as much at London Docks: but this is liable to considerable variation.

The rise in the upper part of the River pond may be easily accounted for by the accumulation of the fresh waters of the River over and above what is tidal water. The fall from London towards Putney seems to show that the tide has not time, through the contracted passage, to fill up the pond above bridge to the lower level.

From London Bridge to Blackwall the high water seems, from the observations, to be level; the quantity of water required to fill up this difference of level is, after all, so small, that with an unobstructed water-way it would evidently make no difference worthy of notice in the level of the tide below bridge, even were it subtracted from the mass that lies between London Bridge and the Nore.

Whereas, considering the great rapidity with which the lower part of the River is filled by the tide, it is clear that an unobstructed tide would fill up this trifling increase in at least as little time as the present period.

But, to render this a matter of calculation: we find the average breadth of tide-water at the Nore to be 3½ miles; at Gravesend, half a mile, the distance being 18 miles; which, at 6,000 feet per geographical mile, with 15 feet of tide, gives, from the Nore to Gravesend, 17,000 millions cubic feet of tide-water. At London Bridge, taking the breadth at 1,000 feet and 3,000 at Gravesend, we have in 24 miles, and with the same depth, 4,320 millions of cubic feet, or one-fourth additional tide-water.

There runs at present through London Bridge, between the lowest ebbs and high water of ordinary springs (or 14-feet tides) above bridge, 582 millions cubic feet (582,342,710); and if London Bridge be removed, so that there be no

material dam at low water, we have also to fill the pond now caused by that dam. This pond is from 4 to 6 feet deep at the bridge, at low water; and we find that the level of low water above bridge meets the bottom of the Thames between Putney and Kew, viz. 10½ miles above bridge: taking this as the head of the pond, the average breadth at 600 feet at low water, the mean depth to be filled at 2 feet, we have an addition of 75 millions of cubic feet, or 1-57th of the quantity of tide-water between London and Gravesend, or only 1-284th of the whole quantity of tide-water within the Nore; therefore, the whole water which must pass the New Bridge, to raise the upper River to the level of high water below bridge, is 657 millions, or 1-32d of entire quantity of tide-water within the Nore below bridge.

It is a well-known fact, that the tide in narrow channels, with funnel-shaped mouths, or against coasts which oppose its regular course, rises considerably higher than at the places which are situated in retired bays, or under the wake of projecting points: thus the Atlantic tide running up the Channel rises 6 or 7 fathoms against the French coast near St. Malo and Havre; while, on the opposite English coast, at Portland and Poole, we have only 1 fathom rise.

In St. George's Channel, the tides at Milford and along the Welsh coast rise 4 fathoms; on the opposite Irish coast, from Carnsore Point to Wicklow, hardly 1 fathom. Many similar instances might be given.

Again, as to funnel-shaped mouths: the spring-tide at the entrance of Bristol Channel rises 22 to 24 feet; but as that channel contracts in breadth, the velocity and vertical rise increase in proportion so much, that in King Road it rises between 7 and 8 fathoms. Many other similar instances may be shown.

As may be perceived by the position of the banks of the

Thames' Mouth, the flood-tide comes from the N. E. or German Sea: at half-past eleven it is high water at Harwich, Kentish Knock, and Margate; the oscillation or rise at springs is from 15 to 16 feet: at twelve it is high water at the Nore, and although the rise there is only 14 feet, yet in the Swale, which is in the direct course of the tide, the rise is 17 to 21 feet at half-past twelve.

The general set of the current running up the Thames forms a branch which, at the Nore at noon, rises, as we have said, 14 feet; but from thence the funnel-shape produces a gradual increase in the oscillation until we arrive near London: that at Gravesend, at one, the rise is 16 feet; at Woolwich, at three quarters past one, it is 18 feet; at Deptford, at two o'clock, we have 18¾ feet; but at Billingsgate, at a quarter past two o'clock, there is a rise of 17½ feet only. The action of the tide is now affected by the bridges, the regular progress of this wave being checked, and the surface of the high water declines all the way to Putney, where it is high water at a quarter past three o'clock; but from thence again there is a rise of 1 foot to Teddington, where it is high water at three quarters past four. Hence observe that from Billingsgate to Teddington the wave passes at the rate of 8 miles per hour only, while below Billingsgate the same wave of high water passes at the rate of 20 miles per hour, or more particularly—

	Miles.		Time. Hour.	Time. Minutes.		Miles.	
From the Nore to Gravesend	18	in	1	0	is	18	per hour.
Woolwich	15	—	¾	0	—	20	
Deptford	6½	—	¼	0	—	26	
Billingsgate	4	—	¼	0	—	16	
Swan Stairs, a loss of				10			
Putney	7	in		50	—	8½	
Teddington	11	—	1½	0	—	7⅓	

It is obvious, then, that this rapid diminution of the velocity of high water is caused by the narrow at London Bridge, and that, were that obstruction removed, there is every reason to believe the velocity in the upper River would be greatly increased.

It must also be observed, that the fall or difference of height between the surfaces above and below bridge at high water must not alone be taken as the proper measure of the obstruction, and used as a datum throughout a calculation, because the fall through the whole tide is much greater. In one very moderate spring-tide, which I observed on the 26th of May last, when the fall at high water was only 5 inches, the fall through most of the preceding part of the tide had been 14 inches.

The high water will therefore go up to the head of the tide-way more speedily, and will rise higher than at present.

Secondly, Of the River at Low Water.

This water must also return with greater velocity, and the removal of the bridge will not only permit the increased head to pass off at the ebb, but likewise that portion which is now retained by the obstruction.

Were the flood-tide not to return, and the stream of the River to cease, the bed would exhibit a series of ponds at levels, gradually increasing in elevation as we pass to the westward; of which the first would extend to Battersea Bridge, having a shoal at Westminster Bridge, on which there will be little or no water, and nearly 2000 yards in length.

The second pond, from Battersea to Putney, would be 16 inches higher than the former. At Putney Bridge would be a rise of 17 inches. Above Putney to Mortlake is a shallow channel with small pools; in the deepest passage across the bars there is now less than 3 feet of water.

Mortlake is the next pond, two miles in length. Its surface is level with the present low water at London Bridge; but before the construction of that work, it would, as its name implies, have been a dead or stagnant lake at low water.

The other ponds, which are higher than the present low water, may be observed in the general section. The depth over the bar is no where less than $2\frac{1}{2}$ feet, or more than 4 feet; but this depth is with some difficulty sufficient at present for navigation to the locks at Teddington.

Were the River-water to be run off above bridge, this navigation must cease, unless a new channel be excavated through the shoals: independent of the depression in the lower pond which the New Bridge will permit, a longer time will be given for the ebb to empty the upper reaches, as we may see by inquiring whether the obstruction of London Bridge occasions any remarkable deviation from the progress of the ebb, as we have just found it to do in the case of the flood-tide, whereby we form some judgment of the probable result of its removal with respect to the velocity of the ebb stream.

Allowing, therefore, that the tide at the Nore occupies 6 hours 16 minutes, or the regular half tide, we find that low water proceeds—

		Miles.		Time. Hour.	Time. Minutes.	Miles.
From the Nore to	Gravesend	18	in	1	24	13 per hour.
	Woolwich	15	—	1	8	
	Deptford	$6\frac{1}{2}$	—	0	$37\frac{1}{2}$	$10\frac{2}{3}$
	Billingsgate	4	—	0	$22\frac{1}{2}$	10
	Old Swan, a loss of				20	
	Westminster	2	in	0	$22\frac{1}{2}$	5
	Putney	$5\frac{1}{2}$	—	1	34	$3\frac{1}{2}$
	Teddington	11	—	3	20	$3\frac{3}{4}$

which exhibits the same rapid changes of velocity caused by the bridge as in the case of flood.

Were the bridge removed, therefore, it is evident that the velocity of ebb above Bridge would materially increase—the time of low water be earlier than at present—the drainage of the upper ponds more complete—and the navigation, which is now practicable up to Teddington, would cease too early near that place.

Thirdly, Effects to be produced.

And lastly, from the foregoing statement of facts, it has been shown, that the removal of London Bridge will admit a greater body of water to flow up the River to the westward, and with a greater velocity, which together will considerably increase the momentum; and it is equally certain, that the same cause will operate in the ebbing tide, and leave the bed of the River nearly dry for several hours in the latter part of the ebb. This will, in part, be remedied by the increased velocity and momentum scouring away the mud, sand, and small gravel, so as to deepen the bed; but this cannot take place where the matter has more consistence; and to obtain the same depth as at present at low water would require excavation to a very great extent, probably to incur an expense of 40,000*l*.

But this lowering of the bed, if accomplished either by the tide-scour or artificial excavation, would seriously affect the foundations of some of the other bridges. The piers of Westminster Bridge stand upon gravel, without having piles under them, and several are now not more than 3 feet under the present surface of the River bed, the matter of which I proved to be sand and gravel.

By the plate of the geometrical elevation and plan of Blackfriars' Bridge, published from drawings by Mr. Baldwin, the bottom of the platforms are not more than about 5 feet below the present bed of the River: these piers have, it is true, piles of about 10 feet in length under them; but

if the bed were lowered, they would require to be protected.

Some of the piers of Waterloo Bridge have their platforms laid only at about 6 feet 4 inches under the line of the present low water-mark.

Respecting the bridges between Westminster and Teddington, which stand partly on stone piers, and partly upon wooden piles, I have not hitherto been able to obtain any accurate information; but it is clear that the lowering of the bed of the River would in some measure affect them.

With regard to wharfs and houses, built on the banks of the river, the lowering of the surface of low water, and extending the time of that depression, would afford an opportunity of a greater drainage from the adjacent soil upon which buildings are erected, and may have the effect of causing settlements: if no excavation takes place in the shores adjacent to the wharfs, the barges, &c. will be longer prevented from approaching to or departing from them; if an excavation does take place, there will be some risk of the walls being undermined. These observations apply to the whole River as far as Teddington.

Besides these consequences from lowering the bed of the River, others will unavoidably follow from the tide above London Bridge rising higher than it does at present. Many of the wharfs by the side of the River are not more than from 1½ to 2 feet above Trinity datum, and are not unfrequently overflowed, partly by land floods, but chiefly by high tides, which rise above a foot higher below bridge than they do at present above bridge: the evil will therefore be proportionably increased both in degree and frequency. But besides the common operations of land floods and tides in calm weather, all the River above bridge will, when the dam is removed, be further exposed to the influx of heavier waves driven from the Nore, with storms from

the northward, which have hitherto been checked by the almost solid mass of the upper part of London Bridge. These observations apply to all the banks and low grounds on each side of the River from Westminster to Teddington, and which are very extensive.

Instances of such influx and rising of the tide have been already mentioned, and another has come to my knowledge while engaged in the present survey. At the Cashen river in Kerry, which falls into the sea near the mouth of the Shannon, a bar has been lately cut across to make a more direct navigation: the Upper River has thereby been lowered two or three feet at low water, and at high water raised so as to overflow the marshes more than before; and the direct stream is now cutting a channel through the sandy shoals above the bar. This information I received from the able Engineer (Mr. Nimmo), who advised the measure.

Fourthly, With regard to the Expense.

Having only been in possession of the elementary data for a few days, and finding that to be still incomplete, I can only for the present give a very general statement on this head, reserving to myself in this, as in other instances, the right of further corrections, in order to furnish the Committee with the expense of a Scheme to render the River as perfect as it ought to be.

1. Excavating the bed of the River where required, between London Bridge and Teddington; raising, strengthening, and dressing Banks; forming proper Towing-paths, Back-drains, and Sluices	£60,000
2. Raising and securing Wharfs, &c. &c. in and adjacent to Westminster	10,000
Carried forward .	£70,000

Brought forward .	£70,000
3. Securing Westminster Bridge	25,000
4. Ditto, three Piers of Waterloo Bridge, Surrey side	3,000
5. Ditto, all the Piers and Abutments of Blackfriar's Bridge	6,500
	£104,500

Fifthly, The Effects Eastward of the Bridge.

No longitudinal or cross sections having been taken to the eastward of the Bridge, I have no accurate knowledge of the state of the River bed, and can therefore only observe generally, that my investigations have led me to the conclusion that more water will pass with a greater velocity in every part of the River; but as the difference will diminish as the section increases, the effects will of course disappear in the lower parts of the River. When operations do take place, they will scour and deepen the River, where the matter is alluvial and loose.

THOMAS TELFORD.

24, Abingdon Street, Westminster,
11th June, 1823.

Novel Inventions.

Spinning by Power.

Mr. J. C. Dyer, of Manchester, has succeeded in working a series of Spinning Machinery by Steam Power. Some years back the late Mr. Eaton, of Wiln, Derbyshire, ob-

tained a patent for this purpose; but his machine could never be made to operate correctly, and about two years back the plan was finally abandoned. Mr. Dyer, who, we believe, purchased the remaining term of the patent-right, after considerable exertion, has succeeded in accommodating all the movements of the complicated process of Spinning to one uniform power. Upon the main shaft of the spinning frame there is a sort of irregular cone, against the periphery of which certain rollers act, and thereby accommodate the motions of the several parts of the machine, by giving a variable speed to the spindles, and distributing the threads upon the copts with mathematical exactness.

New Material for Cement.

A new and valuable source of commerce has been discovered in clearing the Entrance to Harwich harbour of an accumulation of stone, by which it has been impeded for a considerable time. The obstruction has been much reduced by being *dredged*, and the produce sold for the purpose of making cement. Upwards of thirty sail of vessels are, we understand, constantly employed, giving occupation to a number of industrious hands, and realizing more than 70*l.* per week from a source which, but for the rapid advancement of chemical science, would have lain dormant.

Mode of rendering Cloth Water-proof.

A chemist, of Glasgow, has discovered a simple and efficacious method of rendering woollen, silk, or other cloth completely water-proof. The mode is said to be by dissolving *caoutchouc* (Indian rubber,) in mineral oil, which is procured in abundance at the gas works.—Put five or six coatings of the mixture, with a brush, on one side of the

cloth, on which another piece of cloth is laid, and pass the whole through between two rollers. The adhesion is so complete, that it is easier to tear the cloth than separate the pieces, which appear to consist of only one fly, and are completely impervious to water. This kind of cloth must be a valuable commodity in a rainy climate.

Reducing Slags to Pure Iron.

In our Fifth Volume, p. 294, we have described a new process of reducing the slags and cinders produced in the working of iron to pure metal; the practical advantages of which has just come under our observation. At Cookley Iron Works, near Kidderminster, Worcestershire, some improvements and extension of the works have recently been commenced, in the progress of which it became necessary to excavate a considerable portion of ground. This ground, it appears, had been anciently the site of other works, filled up with an immense quantity of slags and cinders, the refuse of some ages past. Such a discovery would have been attended with very considerable inconvenience, had it not been for the new process above alluded to, which has caused this heretofore useless refuse to be considered by the proprietors as a mine of no inconsiderable value. The material is purchased at per load, and is now conveying away by means of the Dudley canal, to be worked into pure iron.

Polytechnic and Scientific Intelligence.

Society of Arts.

Our last notice of this Society, up to April, will be found in Vol. V. page 216. We now continue their proceedings,

by stating the subjects which have engaged the different Committees since that time.

Committee of Agriculture and Rural Economy.

On planting forest-trees.—Preparing opium from poppies grown in England.—Method of collecting the juice of poppies.—A new method of raising early beans.—An improved bee-hive.—Transplanting grass for pasture.

Committee of Polite Arts.

On a rest for painters.—Taking casts of leaves and foliage.—A medal die.

The specimens of juvenile art have this year been extremely numerous, and upon the whole highly respectable. Those subjects which have been rewarded will be seen below.

Committee of Chemistry.

On an electro-magnetic apparatus of an ingenious construction, and of very considerable power, shewing several new phenomena, with a multitude of experimental implements, all packed safely together in a small portable case.—Improved melting-pots for founders.—Apparatus for obtaining the analysis of animal and vegetable substances.—An hydrometer.

Committee of Colonies and Trade.

On a tanning matter.

Committee of Manufacture.

On English grass capable of being platted into bonnets.

Committee of Mechanics.

On a chest for containing arms on ship-board.—Quadrant for elevating guns and mortars.—Fid part of the top-

mast of a ship.—Kite for communicating with the land from a stranded vessel, formed by a square sheet of canvas, which is raised for the purpose of being blown on shore, and when thrown out of geer falls to the ground, carrying a considerable length of cord, and by that means forming a communication with the land.—A wheel and pinion with peculiarly formed teeth.—Apparatus for reducing fractures of the lower limbs.—Amputating knife and other surgical instruments.—Kiln for drying grain of a cylindrical form, placed erect, with conical ends, made of double plates of metal; a furnace burning within heats the kiln, and the grain let fall at the apex of the cone above, descends down the sides of the cylinder between the double plates, by which it becomes dried, and discharges itself below at the point of the lower cone on to a cloth spread to receive it.—An horizontal hydro-mechanical press, for extracting oil from seeds.—Safety-valve for steam-engines.—Apparatus for baleing water out of ships, in the event of the pumps being choaked, by sliding a box with a valve in its bottom, down a channel into the hold—A boat to be propelled by paddles instead of oars.—Projecting letters for sign-posts.—Apparatus for producing a rotatory motion from an alternating.—Plan for equalizing the strain on tackle.—Instruments applicable to surgical purposes.—Drag for drowned persons, formed by a frame, with a net and weights, carrying the lower parts of the net into the inequalities at bottom of the river.—Floating life beacon, consisting of a circular float, with four poles raised, and ladders to the top.

The Society bestowed the rewards adjudged, by the hands of his Royal Highness the Duke of Sussex, President, at the King's Theatre, Haymarket, on 28th May, to the following persons:

In Agriculture and Rural Economy.—To Lieutenant-Colonel Wildman, Newstead Abbey, for planting 500 acres with forest trees, the gold Ceres medal. To Messrs. Cowley and Staines, Winslow, Bucks, for preparing 143lbs. of opium from poppies grown in England, thirty guineas. To J. W. Jeston, Esq. Henley on Thames, for his improved mode of collecting the juice of the opium poppy, the large silver medal. To W. Pyle Taunton, Esq. Cheam, Surry, for early horse-beans, the large silver medal.

In Chemistry.—To Mr. James Marsh, Rush Grove Place, Woolwich, for a portable electro-magnetic apparatus, the large silver medal and thirty guineas. To Mr. H. Marshall, Newcastle-on-Tyne, for improved melting pots for brass-founders and steel-makers, the large silver medal. To Mr. J. T. Cooper, 9, Paradise-street, Lambeth, for his improvements in the apparatus for analysing vegetable and animal substances, the large silver medal. To the same, for a hydrometer for saline solutions, the gold Vulcan medal. To G. Gurney, Esq. 7, Argyll-street, for an oxy-hydrogen blowpipe, the gold Vulcan medal.

In Polite Arts: Original Oil Paintings.—To Mr. Hilditch, Jun. 13, Ludgate Hill, for a landscape, the gold Isis medal. To Mr. R. H. Hilditch, 13, Ludgate Hill, for a landscape, the large silver medal. To Miss Eliza Anne Drummond, 5, Rathbone Place, for an historical composition, the silver Isis medal. To Mr. Philip Simpson, 10, Carlisle-street, Soho, for a portrait, the gold Isis medal. To Mr. J. G. Middleton, 24, Manor Place, Walworth, for a portrait, the large silver medal. To Mr. Jos. Miles Gilbert, Bristol, for a marine painting, the silver Isis medal. To Mr. H. Pearsall, Bath, for a landscape, the silver Isis medal. To Mr. F. W. Watts, Hampstead, for a landscape, the large silver medal. To Mr. J. Porter, [illegible], Welbeck-street, for an historical composition, [illegible] Isis medal.

To Miss Rose Emma Drummond, 5, Rathbone Place, for an historical composition, the large silver medal.

Copies in Oil.—To Miss Jane Drummond, 5, Rathbone Place, for a portrait, the silver Isis medal. To Mr. H. Johnson, 7, Rodney Buildings, Kent Road, for a portrait, the large silver medal. To Mr. F. Rochard, 131, New Bond-street, for an historical subject, the silver Isis medal. To Mr. S. Drummond, 14, Church-street, Soho, for an historical subject, the large silver medal.

Original Paintings in Water Colours.—To Miss Robson, Doncaster, for a composition of flowers, the silver Isis medal. To Miss Mary Willis, 49, Upper Norton-street, for a composition of flowers, the large silver medal. To Mr. T. Richmond, 42, Halfmoon-street, for a portrait, the silver Isis medal. To Miss M. Ross, 52, Upper Charlotte-street, Fitzroy-square, for a portrait, the large silver medal. To Miss Frances Eddy, Plymouth, for a composition in flowers, the silver Isis medal.

Copies in Water Colours.—To Mr. James Hamilton Lawson, 30, Berners-street, for a portrait, the silver palette. To Mr. T. Baynton, Bath, for a landscape, the silver Isis medal. To Miss Matilda Smith, 18, Upper King-street, Bloomsbury, for a portrait, the large silver medal. To Miss Mary Jane Hull, Beverley, for a portrait, the silver Isis medal. To Miss Mary Willis, 49, Upper Norton-street, for a flower-piece, the silver Isis medal. To Mr. Frederick Rochard, 131, New Bond-street, for a portrait, the silver Isis medal. To Mr. G. R. Ward, 6, Newman-street, for a portrait, the large silver medal.

Original Drawings in Chalk.—To Mr. J. A. Cahusac, Mount-street, Whitechapel, for a drawing of the Musk Ox, the silver palette.

Copies in Ink, Chalk, Pencil, &c.—To Mr. C. Horatio Bunning, 11, Bernard-street, Russel-square, for an histori-

Original Models in Plaster.—To Mr. Ed. Edwards, 2, Newcastle-street, Clerkenwell, for a groupe, Ulysses and Calypso, the gold Isis medal. To Mr. Ed. G. Physick, 20, Spring-street, Portman-square, for two single figures: Telemachus and Narcissus, the large silver medal.

Models in Plaster, Copies.—To Mr. Mich. Teasdale, 1, Bond-street, Vauxhall, for a head, the silver palette. To Mr. Jos. Deare, 12, Great St. Helens, for a model of a Bacchus, the silver Isis medal. To Mr. Ed. Edwards, 2, Newcastle-street, Clerkenwell, for a model in the round from a group, the large silver medal.

Architecture.—To Mr. P. H. Desvignes, 16, Hunter-street, Brunswick-square, for a drawing of a Corinthian Capital, the silver Isis medal. To Mr. C. Purser, 10, Lawrence Pountney Lane, for an original design for a British Museum, the gold medallion. To Mr. Henry Bassett, 15, Norfolk-street, Strand, for an original design for a British Museum, the gold Isis medal.

Carving in Wood.—To Mr. Nicholl, 6, Grafton-street, East, for a carving in wood of a figure, the gold Isis medal. To Mr. Henry Bailes, 434, Oxford-street, for an original carving of flowers, the silver Isis medal.

To Mr. James Harris, Plymouth, for a syringe to preserve oil-paint in, the large silver medal and ten guineas. To C. Warren, Esq. for his improvements in the art of engraving on steel-plate, the large gold medal. To W. Brokedon, Esq. 11, Caroline-street, Bedford-square, for a rest for painters, the silver Isis medal. To Mr. W. Deeble, 1, Seymour Place, Islington, for his method of taking casts of leaves and foliage, the silver Isis medal. To Mr. G. Mills, 17, Ossulston-street, Somers Town, for the new die of the Vulcan medal presented by him, the gold Vulcan medal.

In Manufactures.—To Mr. W. V. Shenton, Winchester, for an improved engine for tramming silk, the silver Vulcan medal. To Mr. W. Cobbett, Kensington, for plat from English grass, the large silver medal.

In Mechanics.—To Mr. C. A. Siebe, for a tap for hollow screws, the silver Vulcan medal and five guineas. To Mr. E. Pechey, Bury St. Edmunds, for a mangle, the silver Vulcan medal and ten guineas. To Ed. Speer, Esq. 7, New Inn, for his centrifugal check-hooks, the silver Vulcan medal. To R. W. Wilkinson, Esq. Captain R. M. Chatham, for a marine arm-chest, the large silver medal. To J. Amesbury, Esq. 82, Great Surry-street, for an apparatus for fractures of the lower limbs, the gold Vulcan medal. To Mr. W. Raynes, 10, Regent-street, Westminster, for a cap for fractured patella, the silver Vulcan medal and ten guineas. To Mr. James Jones, 150, High Holborn, for a kiln for drying grain, the large gold medal. To Mr. Jas. Dennett, 7, Regent-street, Mile End, for an apparatus for baling ships, the large silver medal. To C. C. Dansey, Esq. Captain Royal Artillery, Havering, for a kite for effecting a communication between a stranded ship and the shore, the gold Vulcan medal. To Mr. J. Evans, 12, Ellen Terrace, St. George's in the East, for his method of equalizing the strain on tackles, the large silver medal. To Mr. J. Elliott, Sheffield, for his apparatus for the use of dry grinders, the gold Vulcan medal.

In Colonies and Trade.—To Mr. J. F. Denovan, Aberdour, Fifeshire, for exporting British cured herrings, fifty guineas. To Mr. Gregory Blaxland, for wine, the produce of his vineyard in New South Wales, the large silver medal.

The Society have also directed, that the following performances in the class of Polite Arts, be exhibited, or

account of their merit, with those to which premiums have been awarded:

A finished anatomical drawing, by Mr. G. Simpson; an original painting of flowers, by Miss Bowley; a copy of a miniature, by Mr. Edwin Dalton; a finished drawing of the Gladiator, by Mr. J. Padgett; a drawing of the Altar Screen of St. Saviour's Church, Southwark, by Mr. G. Gwilt, Jun.; a copy, in oil, from the bust of Homer, by Mr. Philip Corbett; a copy of a miniature, by Miss Mary Anne Hale.

The society have also voted their special thanks to Captain Hawkins, for his plantation of forest trees, near Kingsbridge, Devon; to Mr. T. Jones, Ludgate Hill, for his guard to the wheels of waggons.

Since the last distribution, one hundred and twenty-five new members have been elected.

The society having closed their sitting, for the present session, the different committees have since been engaged in preparing the list of premiums to be offered for works connected with the Arts, which we shall take the earliest opportunity of noticing.

Astronomical Society.

April 11th.—A letter was read on a Phostosphere observed at Buckholts, in Germany, round Venus, Jupiter, and Saturn, from M. Pastorff to the late President. At the same meeting was read an extract of a communication from M. Littrow, Director of the Imperial Observatory at Vienna, to the foreign Secretary of the Society, relative to the cause of certain discrepancies in astronomical observations; on the construction of philosophical instruments, and on correction for refraction. An address lately published by the Society announces that

medals in bronze, silver, and gold, are to be bestowed as honorary distinctions on such persons as shall make material improvements in the science of astronomy; and a list is given of the objects most worthy of attention and encouragement. Among the instrumental improvements are mentioned the perfection of the achromatic telescope, a simple but effectual contrivance for enabling an observer to determine the right ascension and declination of small stars, without illuminating the wires in the field of the telescope: —an instrument for determining the apparent magnitude of the fixed stars; and a method of applying the reflecting telescope to transit or circular instruments, in as useful a manner as the refracting telescope.

The Society's gold medal, and twenty guineas are offered for the best paper on the theory of the motions and perturbations of the satellites of Saturn. The papers to be sent in on or before the 1st of February, 1824.

A gold medal has been presented to Mr. Babbage, for his late extraordinary invention of applying machinery to the calculation and formation of mathematical tables.

May 9th.—The reading of a Paper by Francis Baily, Esq., F. R. S., on the mercurial compensation pendulum for clocks, was commenced; but owing to its length, the conclusion was deferred till the next sitting.

On the same evening, Mr. C. H. Adams, of Edmonton, presented to the Society a series of drawings exhibiting the solar spots observed by him from August, 1819, to the present time, for which interesting present the Society voted him their Thanks.

June 13.—The reading of Mr. Baily's Paper on the Pendulum was resumed and concluded. In this paper much pains has been taken to get together a great mass of information respecting the nature of compensation

pendulums. The expansion of mercury is particularly examined, and a formula given for applying it to the pendulum. A new and very accurate mode of adjustment is described, and the author concludes by a recommendation of a very simple, cheap, and efficacious compensation pendulum, composed of wood and lead only, and which he states, admits of great accuracy, and is applicable to many useful purposes.

Asiatic Society of London.

We announced in Number XXX. of this Journal, that considerable progress had been made in the institution of a society under this title for the encouragement of the arts and sciences in connection with India, and the countries generally to the eastward of the Cape of Good Hope. The number of members already exceeds three hundred; and the first meeting of the institution was held on the 15th of March, at the Thatched House, St. James's Street; when H. T. Colebrooke, Esq. having been called to the chair, announced that His Majesty had been pleased to become Patron of the Society; and that the Marquès Wellesley, the Marques of Hastings, and the President of the Board of Commissioners for the Affairs of India were nominated Vice-Patrons.

April 19th.—The second meeting of the Society was held at Willis's Rooms, H. T. Colebrooke, Esq., Director, in the chair. The laws framed by the Council were submitted and approved; and a donation announced of upwards of 2000 Chinese books, manuscript and printed, from Sir George Staunton. The first part of a memoir was read concerning the Chinese, by J. F. Davies, Esq., which states that the marvellous antiquity claimed by some of the chronicles of China, is rejected as fabulous by the enlightened and scientific men of that country.

New Patents Sealed in 1823.

To Robert Winter, of Fox Court, in the city of London, Esq. for an improved method of conducting the process of distillation.—Sealed 22d day of April—6 months for inrolment.

To John Hall, the younger, of Dartford, in the county of Kent, engineer, for an improvement in the machinery to be employed for effecting or producing the pressure on lind-seed, rape-seed, or any other oleaginous seeds or substances from which oil can be expressed; for the purpose of expressing oil from the aforesaid seed or substances.—Sealed on the 23d day of April—6 months for inrolment.

To Joseph Taylor, of Manchester, in the county palatine of Lancaster, machine maker, being one of the people called Quakers, for certain improved machinery, or apparatus to facilitate or improve the operation of spinning, doubling, and throwing silk, cotton, wool, or flax, or mixtures of the said substances.—Ssaled on the 29th day of April—6 months for inrolment.

To John Bourdieu, of Lime Street, in the city of London, Esq. in consequence of a communication made to him by a certain foreigner residing abroad, for the preparation of a mucilage or thickening matter to be used in painting or colouring linen, weollen, and cotton cloths and silks, in cases in which gums, mucilages or other thickening matters are employed.—Sealed on the 24th day of April—4 months for inrolment.

To Thomas Attwood, of Birmingham, in the county of Warwick, banker, for a communication made to him by a person residing abroad, of certain improvements in the making of cylinders for the printing of cottons, calicoes, and other articles.—Sealed on the 3d day of June—6 months for inrolment.

To Richard Badnall, the younger, of Leek, in the county of Stafford, silk manufacturer, for certain improvements in dying.—Sealed on the 3d day of June—6 months for inrolment.

To Thomas Miles, of Dudbridge, near Stroud, in the county of Gloucester, cloth-dresser, for communications made to him by certain foreigners residing abroad, of certain improvements on machines for shearing or cropping woollen-cloths.—Sealed on the 3d day of June—6 months for inrolment.

To Edward Cowper, of Kennington, in the county of Surry, mechanist, for certain improvements in machines, and apparatus for printing calico, linen, silk, wool, paper, or other substances capable of receiving printed impressions.—Sealed on the 10th day of June—6 months for inrolment.

To Charles Macintosh, of Crossbasket, in the county of Lanark, Esq. for a process and manufacture, whereby the texture of hemp, flax, wool, cotton, and silk, and also leather, paper, and other substances, may be rendered impervious to water and air.—Sealed on the 17th day of June—6 months for inrolment.

To James Smith, of Droitwich, in the county of Worcester, civil engineer, for an apparatus for the applying of steam for the boiling and concentration of solutions in general, crystallizing the muriate of soda from brines containing that salt, melting and refining of tallow and oils, boiling of sugar, distilling, and other similar purposes.—Sealed on the 19th day of June—6 months for inrolment.

To Moncrieffe Willoughby, of Fair Street, Horsleydown, in the county of Middlesex, gentleman, for certain improvements in the construction of vessels, so as to enable them to sail with greater velocity.—Sealed on the 26th day of June—6 months for inrolment.

To John Green, of Mansfield, in the county of Nottingham, Whitesmith, for an improvement in certain machines used for roving, spinning, and twisting cotton, flax, silk, wool, or other fibrous substances.—Sealed on the 26th day of June—6 months for inrolment.

D.	H.	M.	S.	
1	1	34	0	☾ in quadrature entering the last quarter.
1	20	18	0	☉ in opposition to ♅
2	0	0	0	☉ in Apogee.
4	4	19	0	☾ in conj. with ♄ long. 1s 21° 31′. Dif. dec. 6° 57′ ☾ 22° 47′ N. ♄ 15° 50′ N.
5	0	0	0	☿ stat. long 2s 28° 5′.
6	1	56	0	☾ in conj. with ♂ long. 2s. 29° 34′ Dif. dec. 2° 55′ ☾ 26° 16′ N. ♂ 23′ 21′ N.
6	10	34	0	☾ in conj. with ♃ long. 2s 24° 40′. Dif. dec. 3° 6′ ☾ 26° 13′ N. ♃ 23° 7′ N.
6	15	34	0	☾ in conj. with ☿. long. 2s. 28° 5′. Dif. dec. 6° 38′ ☾ 25° 46′ N. ☿ 19° 8′ N.
7	0	0	0	☾ in Perigee.
7	0	0	0	☉ Eclipsed, visible at Greenwich.
0	17	18	33	Beginning.
0	17	32	4	Greatest obscuration.
0	17	32	53	Visible conjunction ● New Moon.
0	17	46	8	End of eclipse. Digets eclipsed 0° 24′ 15″ on ☉'s Northern Limb.
10	23	5	0	☽ in conj. with ♀ long. 5s 2° 38′. Dif. dec. 3° 53′ ☽ 7° 30′ N. ♀ 11° 23′ N.
14	13	26	0	☽ First quarter.
16	0	0	0	☿ at its greatest elongation.

D.	H.	M.	S.	
17	0	0	0	♃ in conj. with ♂ long. 2s 27° 0′. Dif. dec. 0° 43′ ♃ 23° 7′ N. ♂ 23° 50′ N.
18	5	56	0	☽ in conj. with α ♏. long. 8s 7° 23′ Dif. dec. 29′ ☽ 25° 33′ S. α♏ 26° 2′ S.
18	15	5	51	♃'s 1st Sat. eclipsed.
20	21	43	0	☽ in conj. with ♅ long 9s 8° 51′ Dif. dec. 1° 13′ ☽ 24° 45′ S. ♅ 23° 32′ S.
21	0	0	0	☽ in Apogee.
22	0	0	0	☽ Eclipsed, partly visible.
0	13	35	47	Beginning.
0	14	42	32	Beginning of total darkness.
0	15	32	2	Middle.
22	15	34	2	Ecliptic opposition ☉ Full moon.
0	16	21	33	End of total darkness.
0	16	34	33	☾ sets eclipsed.
0	17	28	18	End of eclipse. Digets eclipsed 18° 11′ 45″ from the north side of the Earth's shadow.
23	6	3	0	☉ enters Leo.
29	0	0	0	♀ illuminated 6 dig. on her western edge app. diam. 23″
30	10	56	0	☾ in quadrature entering the last quarter.
31	14	36	0	☾ in conj. with ♄ long 1s 22° 20′ Dif. dec. 6° 50′ N. ☾ 23° 10′ N. ♄ 16° 20′ N.

METEOROLOGICAL JOURNAL, JUNE, 1823.

1823.	Thermo.		Barometer.		Rain in inches.	1823.	Thermo.		Barometer.		Rain in inches.
	Higt.	Low.	+	—			Higt.	Low.	+	—	
MAY.						JUNE.					
26	65°	46°	+ ,08	. .	. .	11	64°	40°	. .	—,01	. .
27	67	42	,06	. .	. .	12	68	37	+,02	—,02	. .
28	68	45	,05	. .	. .	13	72	43	,02	—,05	. .
29	69	42	,03	. .	. .	14	71	55	. .	—,01	. .
30	69	39	,04	. .	. .	15	68	50	,16	. .	. .
31	66	44	,01	. .	. .	16	68	37	,07	. .	. .
JUNE.						17	69	37	,01	— ,02	. .
1	77	39	. .	—,10	. .	18	55	40	. .	—,09	. .
2	76	54	. .	—,21	. .	19	60	45	. .	—,06	. .
3	61	42	. .	—,06	,45	20	69	46	. .	—,03	. .
4	58	40	. .	—,01	. .	21	61	39	,06	. .	. .
5	63	38	+ ,02	. .	,175	22	54	46	,01	. .	. .
6	64	35	,23	. .	. .	23	55	48	. .	—,04	. .
7	69	45	,01	—,05	. .	24	37	66	,02	—,07	. .
8	68	46	,02	—,04	. .	25	36	65	. .	—,09	. .
9	64	44	,04	. .	. .						
10	59	42	,08	. .	. .						

Lower Edmonton. C. H. ADAMS.

ERRATUM,—In our last Meteorol. Journal, May 18, for Therm. Low. 32 read 52.

LITERARY AND SCIENTIFIC NOTICES.

M. Belzoni has presented to the Fitzwilliam Museum, Cambridge, the lid of a sarcophagus, found by him in one of the tombs of the kings of Thebes.

A short time ago the College of Physicians were presented with a human heart, found in a sarcophagus dug out of the ruins of an Egyptian temple; and which retains its full size and fleshy softness.

M. L. de Latour has recently returned to Paris, after many years researches in the peninsula of India. The fruits of his labours will be in a very high degree conducive to the improvement of the natural sciences.

M. R. Mickleham is about to publish a Practical Treatise on the various methods of heating buildings by steam, hot air, stoves, and open fires; with some observations on the combustion of fuel, burning of smoke, and other subjects connected with the economy and distribution of heat.

Mr. C. Dubois, F. L. S. is about to publish an easy introduction to Lamarck's arrangement of the genera of shells.

Sir R. Phillips is on the eve of putting to the press a new edition of his essays on the proximate causes of the phenomena of the universe.

Professor Meulemeester, of Antwerp, who has been for eleven years engaged in copying the fine scripture frescoes in Raphael's gallery, in the Vatican, is now exhibiting his copies in London. We rejoice to hear that engravings of them are in progress.

We have been highly gratified by a visit to the exhibition of the models of Palestine, and the North Pole; and shall take the earliest opportunity of noticing these novelties as connected with the Arts.

Mr. F. J. Daniell has in the press a volume of meteorological essays.

Mr. Ackermann has recently added two more to the numerous list of works remarkable for the taste and beauty of their typography and embellishments, which he has already presented to the public.

Mr. Buckler is about to publish, in monthly numbers, views and descriptions of the cathedral churches of England and Wales.

The library of the Surrey Institution, which was valued at 1,500*l.* has been sold by Mr. Saunders for upwards of 2,775*l.*

Mr. H. R. Palmer has just published a small tract containing observations on railways, with a particular description of his improved railway, mentioned in our Fifth volume, p. 57. This little treatise abounds with practical observations on those railways heretofore constructed, and contains a table, shewing the comparative amount of resistance on different inclined planes, with many other useful matters, which we shall take an opportunity of noticing.

Mr. Gouldworthy Gurney is about to publish his interesting lectures on chemistry, delivered at the Surrey Institution, and noticed in our Fifth volume, p. 106, in which his new theory of crystallization is developed. We shall notice this when it appears.

A new fluid has been recently discovered, by Dr. Brewster, in the cavities of minerals. It possesses the remarkable property of expanding about *thirty* times more than water: between 75 and 83, or at the heat of the hand it always expands, so as to fill the vacuum of the cavity which contained it: at the lower temperature it contracts, and the vacuity re-appears. If such a fluid could be obtained in quantities, its utility in the construction of thermometers would be incalculable; but it exists in portions too minute for chemical analysis; an idea of which may be formed from Dr. Brewster's statement of having discovered a stratum of the cavities, in which he has reckoned in the space of 1-7*th of an inch square, thirty thousand cavities*, each containing this new fluid, a portion of another fluid like water, and a vacuity besides.

LONDON:
SHACKELL AND ARROWSMITH, JOHNSON'S-COURT, FLEET-STREET.

Clarks Boiler

Fig 2.

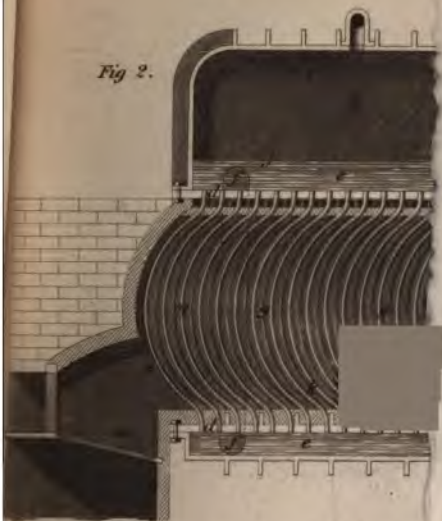


Fig:3.

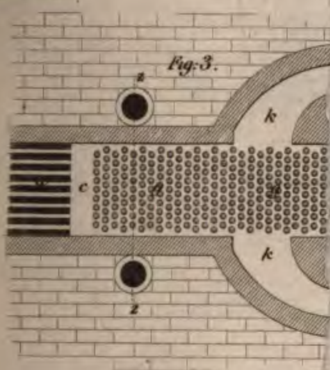
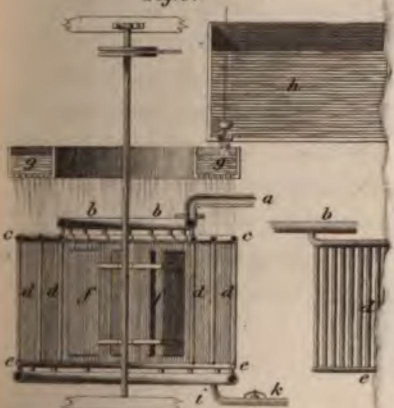


Fig:5.



THE

London

JOURNAL OF ARTS AND SCIENCES.

No. XXXII.

Recent Patents.

To Alexander Clark, *of Dron, in the Parish of Leuchars, in the County of Fife, North Britain, Esq. for an Improvement in the Boilers and Condensers of Steam Engines.*

[Sealed 21st March, 1822.]

The improvements herein proposed, as regards the construction of boilers, apply principally to those intended to be employed for engines worked by steam at a high pressure. These boilers are constructed of a multitude of bent tubes, placed in an erect position, by which a greatly extended surface is exposed to the action of the fire. The extremities of the tubes open into chambers filled with water, from which the tubes are supplied and kept constantly full.

Plate III. fig. 1, is a cross section of the boiler and furnace, taken through at the dotted line, *z*, *z*, in the horizontal section: fig. 2, is a longitudinal section of the same,

shewing the form and arrangement of the tubes; and fig. 3, is the horizontal section or ground plan, in which the form and construction of the flues are displayed; the respective letters referring to the same parts in each of these three figures. *a*, is the fire-place; *b*, the ash-pit; *c*, *c*, the furnace containing the tubes. This space is enclosed above, below, and on the sides, with fire-brick. *d*, *d*, *d*, *d*, are cast-iron plates, having apertures for the tubes to pass through, and into these apertures the ends of the tubes are secured; *e*, *e*, are the upper and lower parts of the boiler, containing distilled water, which flows through the perpendicular columns *f*, *f*, *f*, *f*. These columns support the upper part of the boiler, and connect it to the lower part, the whole being united by flanges and bolts, and forms one vessel. *g*, *g*, are the curved tubes filled with water for generating steam, upon the external surface of which the fire acts.

These tubes are proposed to be made of sheet copper, about one-tenth of an inch thick, brased at the edges, or soldered with spelter, and about one inch diameter. The curved form given to them is for the purpose of enabling the metal to expand or contract under different temperature, without fracturing. There is a space between the arch of fire-brick above and the upper plate *e*, in order to prevent the heat of the furnace injuring the plate. *h*, is the waggon head of the boiler, and *i*, is the pipe for conveying the steam to the engine. *k*, *k*, are flues for the escape of the smoke into the chimney, *l*, is a pipe by which the boiler is fed with water. The lower parts of the boiler, the plates *e*, *e*, and the waggon head, are strengthened by flanges or ribs, as shewn in the first and second figures.

Fig. 4, is an apparatus for injecting water into the boiler, and for working the damper and safety-valve. In

this figure, *m*, is a cistern of water, with a valve in the bottom, which is opened or shut by means of a chain or cord passing over a pulley to a float in the boiler; *n*, is a forcing-pump, to be worked by the engine; which injects water through the pipe *l* to the boiler. *o*, is a vessel connected by a branch with the tube *l*, which vessel contains cold water; the lower part of this communicates with the cylinder *p*, where a piston is introduced and loaded by a number of weights, equal to the pressure at which the engine is intended to be worked.

The tubes and chambers of the boiler being filled up to the line *j*, *j*, in the waggon head, with distilled water, the fire is to be introduced into the furnace, the heat of which, in its passage through to the flues, acting upon the external surfaces of the tubes *g*, *g*, will cause steam to be generated therein, and rise up the tubes into the waggon head above, and thence pass through the pipe *i*, to the engine. A considerable quantity of water rising in the tubes with the steam, will return through the columns *f*, *f*, to the lower part of the boiler, and again re-enter the tubes at their lower extremities, by which a constant circulation of the water is continued through the boiler.

Should the pressure of the steam at any time exceed that force under which the engine is intended to be worked, the water will be pressed back through the pipe *l*, when the small valve *x*, at the lower part of the pipe will prevent its return into the pump *n*, or cistern *m*, and direct it into the vessel *o*, and cylinder *p*, where its force will raise the loaded piston, by means of which, a damper connected to the chain *q*, will be lowered in the flue of the boiler, and consequently reduce the power of the fire. Should the force of the steam continue to raise the piston in the cylinder *p*, after the flue is closed by the damper, a safety-valve may be opened by a weight attached to the chain *q*, which shall

act upon a lever and raise the valve; this, however, may be effected by various other means.

The improvements proposed in the condensers of steam-engines are of two kinds, which respectively suit situations either where there is a scarcity of water, or where the supply is abundant. Where water is scarce, the condenser is proposed to be constructed as fig. 5, which exhibits a vertical section of the apparatus, fig. 6, being a horizontal representation of the top part of the same: *a* is the eduction pipe, which conveys the steam from the engine after it has performed its office; *b*, *b*, is a circular tube, or main, for distributing the steam into the curved branches *c*, *c*, *c*. From the respective branch-tubes, a number of small perpendicular pipes *d*, *d*, descend into a lower series of branch-tubes *e*, *e*, called collecting tubes.

One of these branches, with its upper and lower curved tube, and its range of perpendicular pipes, is shewn detached at fig. 7, for the purpose of rendering the construction of the whole better understood. There are many of these branches with their ranges of pipes extending from the main tube *b*, as particularly seen in the top view, fig. 6.

The steam from the eduction-pipe of the engine passes into the circular main tube *b*, and thence through small necks into the several curved branches *c*, *c*, *c*; from thence it descends down the perpendicular pipes, *d*, *d*, to the lower curved branches, or collecting tubes, *e*, *e*.

In the centre of these ranges of tubes, a fan-wheel *f*, is placed horizontally, which is made to revolve by means of a pulley on its shaft, and a band connected to the axle of the fly-wheel of the engine. Above the tubes there is a circular vessel of cold water, *g*, *g*, supplied from a cistern *h*. The cold water from this vessel *g* descending through small holes, falls upon the tubes below, which are respec-

tively coated with cloth or other absorbent substance, in order to retain cold water on their surfaces. These tubes are recommended to be of thin copper, and of no greater substance than is necessary to sustain the pressure of the atmosphere.

When the steam has filled all the tubes, its heat will pass through the metal to the wet cloth, and thereby evaporate, consequently the temperature of the steam within becomes reduced, and condensation immediately takes place. This effect is still further promoted by the wind, excited as the fan-wheel revolves, which drives off the heat already liberated, and thereby greatly increases the evaporation.

The water thus produced by the condension of the steam within the tubes, flows through the collecting branches to the pipe *i*, and thence to the air-pump of the engine which throws it into the cistern *m*, fig. 4, for the continual supply of the boiler. Thus the same water may be used for generating the steam again and again, and that for the condensation also, by pumping it up from the receiving vessel below to the cistern *h*, and the only accession of water required for carrying on the operation of the engine, will be a quantity equal to that thrown off by evaporation from the external surfaces of the tubes.

It is necessary that this apparatus should be placed in an open situation, that the water evaporated may readily escape into the atmosphere; and it is requisite that an escape-valve, as *k*, should be placed in the lower pipe *i*, in order to allow the steam to pass when the apparatus is blown through, previous to putting the engine in action.

In situations where there is an abundant supply of water, the condensor is proposed to be constructed as shewn in fig. 8, where *a* is the main eduction-pipe through which the steam passes from the engine: *b*, *b*, are two distribut-

ing pipes which branch from the main, fig. 9, is an enlarged representation of this part, viewed at the end, the same letters referring to the same parts respectively in both figures. Nine smaller distributing pipes, *c c c*, branch off from the two larger pipes, *b b*; from these the steam flows into eighty-one condensing pipes, *d d d*, shewn lengthwise in the section of the box, fig. 8, and which lead into the branch-pipes, *e*, and thence to the collecting-pipes, *f*, *f*, at the lower part of the range, which are similarly constructed to the distributing pipes before described.

The steam from the eduction having filled all the branches and condensing-pipes, cold water from the cistern, *h*, is allowed to flow through the valve, *i*, to the box containing the pipes, and having passed along the box, it is discharged at the reverse end by the waste pipe, *j*; the effect of this is, that the heat from the pipes becomes abstracted by the cold water, and the steam within consequently condenses, the water from which collecting in the tube *k*, passes to the air-pump of the engine, and is thence thrown into the cistern of distilled water for supplying the boiler of the engine.

In the pipe *k*, is a valve *l*, opening outwards for the purpose of allowing the steam to escape when the apparatus is blown through previously to putting the engine in operation. The valve *i*, and the valve *m*, are connected together by a rod, *n*, and two levers, by which means they act reciprocally, and shut off the supply of water from the cistern at the same time that it is discharged from the box.

The patentee observes, that although the drawings and description exhibit precise forms, dimensions, and materials for the construction of the boiler and condensors, yet he does not mean to confine himself to those particulars. The boiler may be made stronger, if an extraordinary high pressure of steam is required, by making all the parts

thicker that are represented as of cast iron, the bolts more numerous and stronger, and the furnace-tubes of a smaller diameter; they should not be of thick metal, as that would prevent the heat from passing through to the water, and occasion an irregular expansion and contraction of the exterior and interior surfaces, consequently a greater wear and probability of fracture.

The tubes of the boiler may be secured in the top and bottom plates by countersinking the holes, and cutting screw-threads therein; after which ferrules may be introduced, and a mandril being driven into the mouths of the tubes will force the metal into the threads, and firmly secure them to the plates. When any of the tubes require to be repaired or displaced, the bolts may be unscrewed, and the top or bottom plates be removed. Every tube of the boiler constructed as above, will act as a safety-valve, for the strongest tube must burst before the boiler could blow up, and the bursting of them must be confined to the interior of the furnace.

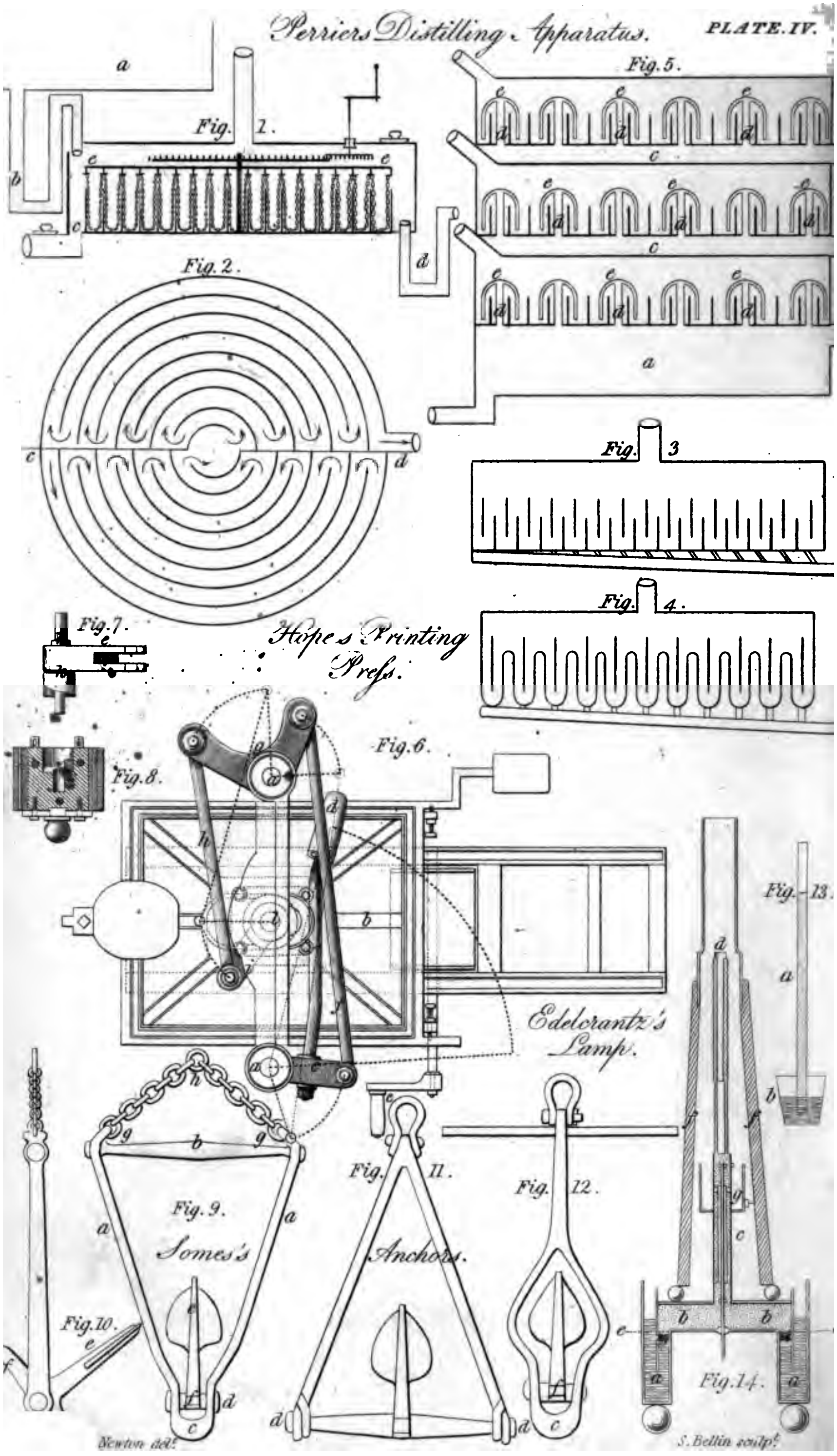
"The advantages of this construction of boiler are—first, its capability of working with high pressure steam without any danger of exploding; secondly, will occupy very little space compared with the power gained, and will diminish the size of the engine in nearly the same proportion; thirdly, will expose great surface to the action of the fire, and in consequence of the metal being thin, of which the tubes are composed, they will take in the heat very rapidly, perhaps three or four times as fast as an ordinary boiler of the same extent of surface exposed to the fire; fourthly, exposes little surface to the external air, and that part which is exposed being very thick, little of the heat can pass through; fifthly, being worked with distilled water, will seldom or ever require to be cleaned out, and will not be liable to have a concretion of stone, salt, or other

substance on the interior surface, which in ordinary boilers frequently prevents the heat passing to the water, and is the cause of the boiler at those parts becoming red-hot and burning a hole, by which the boiler is rendered unserviceable."

The advantages of these constructions of condensers are first—their applicability to any ordinary engine; secondly, affording an opportunity of charging the boiler with the same water again and again; thirdly, affording the opportunity of working engines when there is a small supply of water; fourthly, requiring a much smaller air-pump than is usually employed to such engines; fifthly, the applicability of condensors of the second description to steam-vessels. The advantages of the boiler and condensor, when used together, are said to be, 1st, when wrought to the pressure to which the boiler is calculated, " a saving of nine-tenths of the whole quantity of fuel now used in ordinary low pressure engines; 2d, in the compactness of the apparatus particularly suited to steam vessels.

The claims of the patentee are; 1st, raising the steam in small curved tubes; 2d, making those parts of the boiler which are exposed to the action of the fire thin in the metal; 3d, making those parts of the boiler which are not exposed to the action of the fire very thick and strong, much stronger than the other parts in proportion, and in guarding those parts that are so made thick from the fire, to prevent injury, by expansion or contraction; 4th, combining the boiler with either of the condensers before described, by which it can be wrought with distilled water only, with a very little additional supply; 5th, condensing the steam from engines, by the evaporating condenser first described, or the other condenser last described!!

Inrolled, September, 1822.


Perriers Distilling Apparatus.
PLATE. IV.
Fig. 1.
Fig. 2.
Fig. 3
Fig. 4.
Fig. 5.
Hope's Printing Press.
Fig. 6.
Fig. 7.
Fig. 8.
Edelcrantz's Lamp.
Fig. 9.
Somes's Anchors.
Fig. 10.
Fig. 11.
Fig. 12.
Fig. 13.
Fig. 14.
Newton del.t
S. Bellin sculp.t

To Sir Anthony Perrier, *of the City of Cork, in the Kingdom of Ireland, Knight, for his Invention of certain Improvements in the Apparatus for Distilling, Boiling, and Concentrating by Evaporating various sorts of Liquids and Fluids.*

[Sealed 27th July, 1822.]

The design of this invention is to cause the liquid operated upon in the process of distillation, to flow gradually over the heated surface of the boiler, during which progress it continues to give out its spirituous evaporation. The quantity of liquid allowed to be acted upon, or to pass through the still in a given time, and also its velocity, is regulated by the circuitous route in which it proceeds, and by that means the complete operation of the fire upon the whole of the fluid is insured, and the spirituous evaporation is not impeded or clogged by aqueous or empyreumatic vapours. By this construction of still, a continued and uninterrupted distillation, boiling, or evaporation is effected and carried on without intermission, as long as the supply of liquid is furnished, and the fire kept up.

Plate IV. fig. 1, is a view in profile of the section of a still, or boiler, made on the improved principle, of copper, or any other suitable material, and fig. 2 is a plan of the same. The bottom of this boiler is divided by concentric partitions, which stand up, as shewn in fig. 1, sufficiently high to prevent the liquor from boiling over. These partitions have openings from one to the other, at opposite sides, so as to make the course a sort of labyrinth: *a* is a reservoir of liquor prepared for the operation, *b* is a pipe or tube descending from the reservoir, and conducting the liquor to that part of the boiler marked *c*, which is the commencement of the race. From hence the liquor flows through the channels, as shewn by the arrows, progres-

sively traversing the whole surface of the bottom, whereby the full effect of the fire is exerted upon small portions of the liquid, which causes the evaporation to proceed with great rapidity. The residue of the liquor then passes off by the discharge-pipe *d*, which is made to slide for the purpose of regulating the quantity and depth of the fluid to be operated upon in the still; and this pipe should be in such proportion to the admission-pipe as to cause the perfect distillation of the liquor in its passage to the regulating-tube.

The spirit which rises in the head of this improved still will be found much stronger and purer than that obtained by the ordinary construction of stills, where the spirituous vapour is generally very much mixed with aqueous matters and other impurities. The channels may be extended to any required length, over a bottom of any dimensions, by contracting their breadth.

Stills upon this principle may be made of all sizes and shapes; that is to say, they may be round, square, or of any other figure, and the partitions may be placed in concentric or excentric circles, with openings on their sides, at such distances as shall cause the liquor to flow over the most extended surface of the bottom; or the still may be square, with angular partitions, ranged as a labyrinth, or in any other manner, so as to cause the run of the liquor to be greatly extended over the surface of the boiler. The bottom of these stills may be either flat, concave, convex, conical, or of any other form, and the entrance of the liquor into the still, and also its discharging aperture, may be at the side, in the middle, or elsewhere, as circumstances may dictate.

Boilers or evaporators may be made upon this plan, either with or without heads, and in all cases their capacity for working may be increased by placing layers of pipes

connected thereto within the flues, between the still and chimney, which pipes may be bent or coiled in a serpentine direction, or in any other position, and the liquor to be operated upon made to pass through them previous to its entering the still, by which means the operation may be advanced to any required state of forwardness.

Stills of the above description, particularly if made square, may be divided internally into several stills, each having its separate head and condenser, by which arrangement the spirit condensed from the first still may fall into the second, to be again operated upon, and so on to a third, whereby a rectification may be carried on to any degree at one operation, and by one fire.

In the still shewn at fig. 1, a set of chains are seen suspended from a bar *e e*, supported by a centre-shaft, which may be put in motion by a toothed-wheel and pinion, actuated by a crank or winch. These chains hang in loops, and fall into the spaces between the partitions, for the purpose of sweeping the bottom of the still as the shaft revolves, and preventing the material operated upon from burning when of a thick or glutinous nature, as turpentine, syrups, &c.

"Ledges may be placed between each circle, on the principle more particularly explained at fig. 3, which is square, or oblong, or round, its bottom intersected with parallel ledges, fastened at the ends and bottom if square or oblong, and only to the bottom if round; except, that under each alternate ledge is left a space of any width required between it and the bottom, so that the liquid, in entering at the end or centre, passes over the one, and under the other ledge, until it arrives at the point of discharge. Thus the whole mass, at whatever depth it may be in the still, is submitted to the full effect of the fire in a layer of the thickness of the space between the ledge and the bottom."

"Fig. 4 differs essentially from all the others in this, that the bottom is doubled up and down in plaits, and presents a surface commensurate with the length, depth, and number of the plaits, between each of which (as in fig. 3) a ledge is run from side to side of the still, and fastened to both, leaving a passage the whole length underneath, between its lower edge and the bottom of the groove formed by the plait, by which the liquid, in its whole course, is reduced to a stratum of any thickness required, along a surface of immense extent, occupying comparatively but a small space, and exposed to all the ardour of the fire."

In the foregoing descriptions the stills have been considered as in immediate contact with the fire; but it is proposed to work them by steam, which may be applied either externally or internally, or both, as shewn at fig. 5. In this figure *a* represents a steam-boiler, furnished with safety-valves, and supplied with water in the usual way; this boiler is surmounted by three stills, upon the foregoing principles. The bottoms are perforated at certain distances throughout their whole extent, and into each of these perforations is inserted a tube, branching into ramifications of smaller tubes, the extremities of which are bent down into the liquid flowing through the still. The steam from the boiler passes up the tube *b b*, into the hollow vessels *c c*, and thence through the tubes *d d*, into the smaller curved pipes *e e*, at the extremities of which it pervades the liquid in its progress. If it should be deemed more convenient or advantageous to transmit the caloric from the steam through the metal, without allowing the steam to pass into the liquid, it may be done by closing the extremities of the curved pipes *e e*, and placing them in a horizontal position, with a small inclination, in order to allow the condensed steam to pass into the boiler. Here

Bainbridges Rotatory Steam Engine!

PLATE V.

Fig. 1.

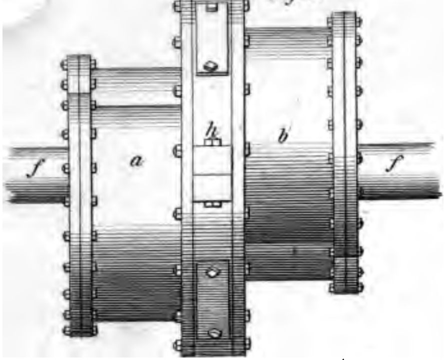


Fig. 2.

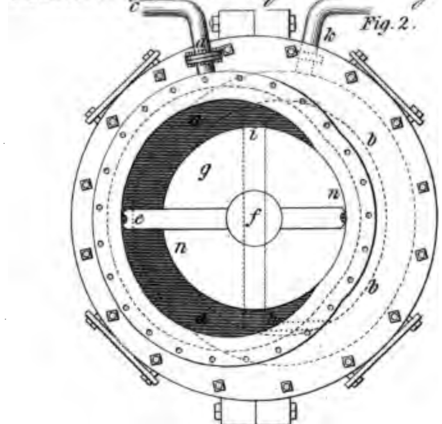


Fig. 3.

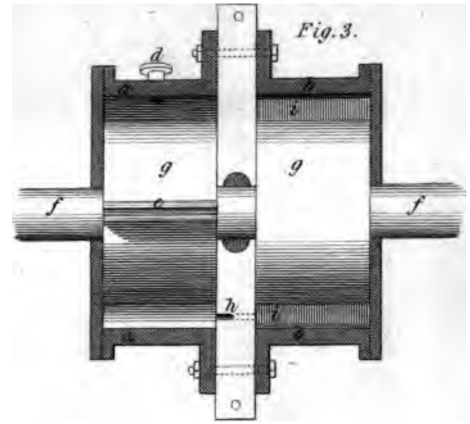


Fig 6

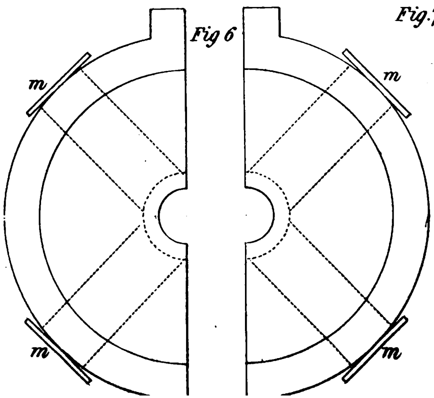


Fig. 7.

Fig. 4.

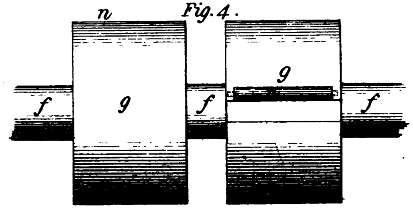


Fig. 5.

Fig. 8.

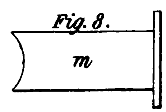
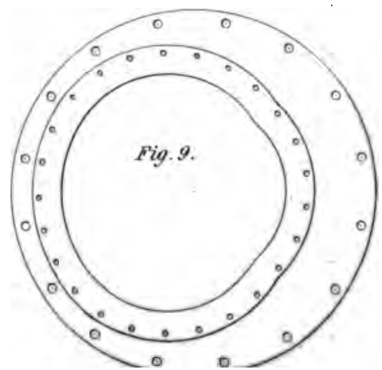


Fig. 9.



the spirit arising in one still might pass into another, and be again operated upon, "and distilleries of every degree, and of various substances, may be carried on, in one continued operation, at the same time, and by one moderate fire, which, upon this principle, would suffice for the largest establishment known."

Inrolled January, 1823.

To John Bainbridge, *of Bread-street, Cheapside, in the City of London, Merchant, for a communication made to him by Amos Thayer, Jun. of the City of Albany, in the United States of America, Mechanist, of certain Improvements on Rotatory Steam-Engines.*

[Sealed 16th December, 1822.]

The improvements on Rotatory Steam-Engines herein proposed, consist in a method of effecting a rotatory motion by the elastic force of steam, exerted against two radient pistons placed at right angles to each other, which are, by the pressure of the steam, made to revolve within two hollow steam-tight metallic boxes. These boxes are separated by a partition, through which an aperture is formed for admitting the steam from one box to the other.

Plate V. fig 1, represents the external appearance of the engin; *a* is one of the steam-boxes, *b* the other. These boxes are of metal, (cast-iron is proposed) made fast by bolts and flanges to the middle partition *h*,*h*(an iron plate of considerable thickness) and the sides of the boxes are formed by other iron plates, bolted to the outer flanges, the whole being securely packed and luted so as to be perfectly steam-tight. Fig. 2 is a side view of the engine; the outer plate, or lateral cap being removed for the purpose of exhibiting the internal form of the box, and the operation of the sliding piston. Fig. 3 is a cross section of

the engine, shewing the interior of both boxes, *a* and *b*, and the middle partition; the similar letters referring to the same part of the engine in each of the figures.

Steam from a boiler (of the ordinary or any other improved construction) is intended to pass through the pipe *c* and by the nozzle *d*, which may be called the induction aperture to enter the box or chamber *a*, where, exerting its expansive power, the radient piston *e* is forced round in the direction of the arrow; *f f* is the rotatory axle, and *g g* are circular blocks circumscribing and revolving with it. Through each of these blocks there is an aperture for the pistons *e* and *i* to slide in, which they are constrained to do, as the axle revolves by the ends of the pistons being in contact with the internal periphery of the excentric boxes *a* and *b*.

When the force of the steam has carried the piston *e* past a perpendicular position, and beyond the aperture in the partition *h*, the steam is allowed to escape through this passage into the second box, or chamber *b*, the form and position of which is shewn by dotted lines in fig. 2. Now, the steam exerts itself against the piston *i*, (shewn also by dots in the 2d fig.) at right angles to the piston *e*, and by a similar operation to that above described, this piston *i* is carried round until it passes the eduction aperture *k*, when the steam escapes, or proceeds to the condenser.

The piston *e* having, before this time, passed the induction aperture *d*, a fresh current of the steam has began to act upon it, and which continues to force it round in the manner explained above. Thus, by the pressure of the steam exerted alternately upon the radient pistons *e* and *i*, rotatory motion is given to the axle *f*, and thence, by the ordinary means of geer, or otherwise, communicated as a moving power to other machinery.

Having explained the general construction and operation

of this rotatory steam-engine, as shewn in figs. 1, 2, and 3, the following figures, and their description, refers to the parts in detail. Fig. 4 represents a portion of the main shaft, or axle, *f*, with the circular blocks *g g*, attached thereto. Fig. 5 is one of the sliding pistons seen edge-wise; in this the grooves are shewn for the reception of packing, which will be necessary in order to keep the edges of the pistons in close contact with the peripheries and sides of the boxes, and thereby render those parts perfectly steam-tight. Fig. 6 exhibits the two parts of the middle partition, detached from the engine and from each other. These are proposed to be formed by two flat pieces of metal, with a recess or hollow in the centre, intended to contain packing, which is best seen in the edge-view of one of the partitions, fig. 7. When these are put together, so as to embrace the shaft, the packing must be pressed close down upon the shaft by means of the plugs *m*, driven into the packing-holes, as shewn by dots in fig. 6. One of these plugs is seen withdrawn at fig. 8.

Packing, of course, must be introduced between the junctions of the partitions, or they must be luted together. The pistons are to be furnished with packing, or their edges made fast into the grooves, as above said; and rollers *n n* are introduced into the blocks on the sides of the apertures, against which the pistons press, for the purpose of relieving the friction and assisting the sliding of the pistons. Fig. 9 is one of the boxes, with its flanged edges shewn detached, which is to be connected to the partition by several bolts, as shewn in figs. 1, 2, and 3.

The principle of this rotatory steam-engine does not confine it to any particular dimensions; that will, of course depend upon the power required to be exerted; and th relative diameters of the blocks to the capacity of t boxes, as well as the breadth of the pistons, is altogeth

arbitrary. An ordinary condensing air-pump may be employed if it should be thought desirable, and also a fly-wheel, but that is not considered as an essential appendage.

This engine, when put in action, produces a rotatory motion as its first movement, which is applicable to the moving of every description of machinery requiring a rotatory power; and by the steam acting in both boxes, upon the sliding pistons, at the same time, a continued uninterrupted force is exerted, without those checks to which the alternating pistons of ordinary engines are subject. Hence a rotatory steam-engine upon this improved plan possesses the advantages of simplicity in its construction, economy in the employment of the steam, and a great increase of power, compared to its size, over every other description of steam-engine heretofore constructed.

Inrolled, June, 1823.

To WILLIAM HOPE *of Tedburgh, in the county of Roxburgh, North Britain, Iron Founder, for certaim improvements in the construction of Printing Presses.*

[Sealed, 18th March.]

THE improvements herein proposed, consist of a new combination of levers to be applied to the Stanhope printing press. The mechanical construction of that sort of press being generally known, the patentee thinks it unnecessary to explain its detail, and therefore only describes those parts which he has either altered or added thereto.

Plate IV., fig. 6, is a plan or horizontal view of the press, the parts shaded being those which appertain to the improvement:—*a a*, are the iron standards of the press, *b* the platten, with the table and form of types under it, which

runs in and out of the press by means of the rounce and winch *c*, in the usual manner. *d* is the handle of the press attached to the short arm or lever *e*, which turns upon a pivot in the standard *a*; *f* is a connecting rod affixed to the arm *e* by a joint; this rod in the usual construction of the Stanhope press, is connected to another short arm or lever, affixed to the middle screw or bolt in the joint of the press.

In the improvement this rod *f* is connected by a joint to one arm of the forked lever *g*, which turns on a cylindrical pivot in the standard *a*, as its fulcram; the other arm of this forked lever is united by a pivot to the back connecting rod *h*, which is jointed to a short arm *i*, extending from the bolt of the press. The improvement, therefore, is the introduction of an additional connecting rod *h*, and a bent or forked lever *g*, by which an increased power is obtained.

The figure represents the parts of the press at rest, and the strong dotted lines the arcs which these levers would describe, and their positions when put in action, "whereby it will be seen," (says the patentee), "that I bring that well known mechanical power, approaching to an infinite power, twice into action, in my new arrangement of the parts above described; whereas in the Stanhope press hitherto made, it is employed only once; and hence I obtain the great additional power above mentioned."

The male and female screws, by which the platten commonly rises and falls, are not used in this improved press, but two inclined planes are substituted in their place; and in order to shew the manner in which the compound leverage is employed to effect the pressure, the figures 7 and 8 are introduced. Fig. 7 represents the short arm *i*, affixed to the bolt of the press *k k*. The upper part of this bolt turns in a socket in the cross piece or head of the press *l*;

the lower part turns in the recess of the slider, fig. 8. which presses upon the platten, and is connected to it in the usual way. Two portions of circular inclined planes are formed upon the lower part of the bolt, fig. 7, and two other portions of corresponding circular inclined planes are made in the upper part of the recess formed in the slider, fig. 8, so that as the bolt turns round (by means of the leverage above described) the action of the inclined planes causes the space between the head of the press and the platten to become elongated, and by that means to effect the pressure. These parts, however, are not the invention of the patentee, and he claims only the additional connecting rod, the bent lever, and the manner of arranging them here shown, so as to produce a proportionate increase of power in the press, and a corresponding ease in working it.

Inrolled, May, 1823.

To William Mitchell, *of the city of Glasgow, Silversmith, for the discovery of a process, whereby Gold and Silver Plate, and other Plate formed of ductile Metals, may be manufactured in a more perfect and expeditious manner than by any process which has hitherto been employed in such manufacture.*

[Sealed 24th August, 1822.]

The improved process upon which this patent is founded, appears to be the employment of a known principle to a new purpose, (viz.) the adaptation of hydraulic pressure in the process of plating, instead of the ordinary mechanical force obtained from the screw press, as heretofore used in the art of plating metals.

The apparatus proposed to be employed is known by the

name of Bramah's press, which in the manufacture of gold and silver plate, and other ductile metals, is found fully to accomplish the desired object in a much more perfect manner than has hitherto been effected by percussion, or any of the other means usually employed in plating.

To adapt water pressure to this manufacture two cast iron blocks are provided, of the same diameters as the ram or piston; the lower one resting upon the piston, the upper one fitted to the shoulder of the press, and fixed thereto by a bolt passing through the top of the press frame, which forms the resistance to the dies used in the manufacture. When the press is in operation, two circular pieces of steel are to be inserted in the faces of the blocks, which are previously fitted with great accuracy and ground into their seats.

In applying such water pressure to the manufacture of plated goods, dies are employed of the same description as have been heretofore used for a similar purpose, and having cut the metal into suitable shapes, and applied it to the dies, the impression required is completed by a single operation of the press, and without having recourse to annealing or softening the metal.

Inrolled, February 1823.

To William Daniell, *of Abercarne, in the County of Monmouth, manufacturer of Iron, for the invention of certain improvements in the Rolling of Iron into Bars used for making or manufacturing Tin Plates.*

[Sealed, 16th April, 1822.]

The improvement herein proposed, consists in rolling the iron intended for the manufacture of tin plates, in a *vertical* direction between rollers instead of horizontally as usual.

The process described in the specification is first, to cut the iron bars into pieces of about four and a half inches square, and then to pass them through the interstice between a pair of *vertical* rollers. These rollers must be grooved; and either several pairs of them employed, or the one pair grooved to different depths. When the piece of iron has been passed through the first or most open pair of rollers, it is introduced between a second pair, then a third, and so on; the interstices between which are made progressively narrower from the first to the last of the series.

The advantages of this process are, that by rolling the iron vertically, the plate is produced in a more perfect manner: for the middle of the bar is extended before the edges, and consequently, if any crack or faulty place occurs it is driven to the sides, or end, and is cut off in squaring, and consequently there will be scarcely any waste or useless plates, whereas in the common mode of preparing iron for tin plates, by passing the pieces through horizontal rollers, the cracks generally enlarge and open towards the middle of the sheets, which are thereby rendered useless.

Inrolled, June, 1822.

To Samuel Francis Somes, *of Broad Street, Ratcliff, Middlesex, ship owner, for an Improvement in the construction of Anchors.*

[Sealed, 18th October, 1822.]

These improvements in the construction of anchors consist in having a single fluke or palm made to turn upon a bolt, pin, or axle, so as to be capable of taking hold of the ground in every way in which the anchor may happen to fall. The frame of iron in which this single fluke is to

work may be of either of the forms shewn in Plate IV. at figs. 9, 10, 11 and 12.

Fig. 9 shews a triangular frame with the fluke working at the lower angle. Fig. 10 being a side view of the same, *a a*, or the sides, *b* and *c*, stretching pieces which may be rivetted or welded together. At *d*, the bolt, pin, or axle of the tumbling fluke passes through the sides; *e* is the fluke, and *f* a projecting piece to guide or direct the fluke into the ground: *g g* are eyes or loops for the reception of the chains which unite in the ring *h*, where the cable is to be fastened. The projecting piece *e*, stops against the stretcher *c*, and thereby gives the fluke a proper angle for holding in the ground.

Figs. 10 and 12, represent other forms of frame-work suited to receive the fluke or palm, and these may be varied according to the skill or judgment of the manufacturer. The construction of these anchors will be so obvious from the figures, that particular descriptions of them would be altogether unnecessary, except that the angle at which the fluke is to stop in fig. 11, will be determined by square projections at the pivots of the axle *d d*, which strike against corresponding projections in the side bars; but the manner of stopping the fluke, fig. 12, is the same as fig. 9 and 10, viz. by the projecting pieces *f*, stopping against the end piece *c*.

The patentee states that he does not confine himself to any particular shape or construction of the frame-work, but he prefers the form shewn at fig. 9, having proved it to be well adapted to receive the fluke or palm, which is calculated to hold the ground more firmly than the common anchor, and without the possibility of fouling the cable or injuring the ships' bottom in shallow water. "My invention does not consist in any particular form or shape of any part of the anchor, but I claim as my invention the single

fluke or palm working upon a bolt or pin, or axle, in any form or shape best calculated to answer the purpose."

Inrolled, April, 1823.

See Piper's Improvements on Anchors, Vol. V. page 246, and plate 12.

To John Dumbell, *of Howley House, Warrington, in the County Palatine of Lancaster, Merchant, for certain Improvements relative to Carriages, which may be applied thereto, or in improving of the organization, driving, actuating, accelerating, or moving of vehicles and carriages in general.*

[Sealed 16th December, 1822.]

This is, without exception, the most extraordinary specification that we ever perused, and in attempting to define its objects we shall be compelled to follow the inventor through a most flourishing and exuberant essay. He first informs us, that to work carriages without horses has been for many years a desideratum, and that he has invented a mode of effecting that object; which contrivance he denominates The Conculcator.

"As in my improvements I aim at copying and imitating the works of Nature, I beg leave to refer to her works as my great original, rather than delude myself or others by any drawings or models, which at best must be mere feeble delineations of what I would specify and describe; and the more so from the great extent and variety with which the works of Nature abound, that are applicable to my purpose. I substitute, in the organization and moving of carriages, *feet,* or *millepedes,* for wheels, as far as this can conveniently or profitably be done; and herein I view Art as Nature's hand-maid; and I would make mighty things spring from small beginnings. As fishes first to shipping did impart their tails the rudder, and their heads the prow, so I

Original Communications.

To the Editor of the London Journal of Arts.

SIR,

Seeing in the number of your Journal for June, (vol. V. page 292,) the specification of an improved lamp, for which Mr. Parker has recently obtained a patent, I think the Public ought to be informed that this lamp is only a modification of the same principles as the Static lamp, invented about twenty years ago by Baron Edelcrantz, one of which lamps was presented to the Society of Arts, and is now to be seen in their repository.

It is remarkable, that you, as well as the Editor of the Royal Institution Journal, have described this lamp as acting by *the superincumbent pressure of the air*, which is not the case, for its operation is effected simply by the balance of gravity between the mercury and the oil; and if the weight of either of these were to preponderate, the oil would be forced out at top of the burner, or the mercury at the sides of the lower vessel.

If the elastic force of the compressed air contained in Mr. Parker's air vessel were the cause of the oil continuing to rise up to the burner, it is very obvious that when the lamp is brought into a warm room, the caloric taken up would increase the elasticity of the volume of air, and force the oil out at top of the burner, so as to drown the wick and extinguish the light; but this is not the principle. The lamp invented by Baron Edelcrantz, and that lately modified by Mr. Parker, both act in the same way, the air vessel as in the latter not being essential to its operation, the principle of these lamps is the same as that

of the barometer, viz. the opposing pressures of columns of fluids having different specific gravities.

The manner in which these lamps act, may be illustrated by fig. 13, plate IV. in which *a* represents a glass tube open at both ends, *b* a tumbler or other glass vessel containing mercury. Let the lower end of the tube be introduced about one inch below the surface of the mercury, when a column of that fluid of one inch long will occupy the lower part of the tube; now pour into the tube at the upper end as much oil as will occupy about fifteen inches in height, which is about the counterpoise to one inch of mercury, and it will be seen that the inch of mercury at bottom will just support the column of oil, but if more oil be introduced, the mercury will be forced out of the tube at bottom, or if more mercury be put into the tumbler the oil will escape at top.

Fig. 14, plate IV. represents a section of Edelcrantz's lamp, which may be compared with Parker's in vol. V. plate XIII. fig. 5. *a a*, is the lower vessel containing mercury, *b b* the sliding cylinder containing oil, upon which the superstructure of the lamp is erected, *c* the rising column, *d* the burner. Mercury is first to be poured into the vessel *a a*, and then the sliding cylinder introduced; oil is now to be poured in at the top of the rising column *c*, which will descend into the chamber *b b*, and there pressing upon the mercury as described above, will cause the sliding part of the lamp to ascend, until the chamber and rising column is completely filled, when the oil from its base line *e e*, to the the top of the rising column, will stand at about fifteen times the altitude of the mercury above the same base line.

The upper part of the lamp and burner is now to be attached, and a sufficient weight placed upon the sliding cylinder to cause it to descend, by which the oil is forced

up to the burner, and if any overflows, it will fall into the vessel *g*, and may there be drawn off by a cock. This forcing of the oil up to the burner in Parker's lamp, is done by loading the box of the sliding cylinder with a weight: in Edelcrantz's, the same is effected by a loaded pyramid, or shaft, *f f*, which presses down the upper part of the lamp exactly like a gasometer; and the greater the height of the burner above the top of the rising column, the greater will be the weight required to force up the oil. Thus as the oil consumes, the altitude of its column compared to that of the mercury by which it is raised, will always bear the proportion of about fifteen to one, and the air in Parker's air vessel, will have nothing to do with the operation.

Having demonstrated that the principle is one and the same in both lamps, though in their mechanical construction slightly varied; I would make one or two remarks upon their comparative merits, arising out of the difference of modification. Parker's lamp has the cylinder *a a*, much higher, and the oil more at the bottom, which is certainly an advantage, but there is a defect in both, arising from the overflow of the oil falling into a vessel attached to the sliding part of the lamp. For if the pressure is sufficient to force the oil out at the top, every drop which descends will increase this force, or if the pressure is not sufficient the oil will not rise to the burner; and it will be extremely difficult for servants to effect that extreme delicacy of adjustment required; and the least agitation of the lamp will cause the flame to undulate. These objections have prevented the introduction of this lamp, though much desired, and certainly ingenious, and will continue to exclude it from general use; for if the difficulties could have been surmounted, such an invention would certainly not have lain dormant for twenty years,

I am, Sir, yours, &c. D. W.

To the Editor of the London Journal of Arts, &c.

SIR,

As the labour of washing and cleansing of linen, cotton, other articles of wearing apparel or furniture, forms no inconsiderable feature in the domestic business of every family, and is also a process that occurs in many manufacturing establishments, perhaps you may not think the following observations upon that subject, unworthy of a place in your Journal of useful Arts.

Being a proprietor of extensive works, connected with the manufacture of linen cloths, and a bleacher by profession, I am tolerably well acquainted with the operations of cleansing, and whiting such fabrics, and with the advantage of different processes in the accomplishment of that object; which may, perhaps exempt me from any suspicion of ignorantly proposing methods which would be detrimental to the articles operated upon. I cannot, however, for a moment doubt, but that the female part of the community will, from early prepossessions, object to any process differing from their usual practice, yet I must be allowed to state the result of experiment, and leave the housewife to reject or adopt my plans, as she may think proper.

The number of females connected with our works, who were, frequently engaged in the business of washing for their families, and the time so employed to the hindrance of our manufactory, induced me to project some plan by which this labour might be reduced, and in so doing I have been fortunate enough to confine this business to less than one fourth the number of persons who were formerly engaged in it, and also to lessen the quantity of soap expended, as well as shorten the time of operation.

My process is this, let the articles intended to be washed

be assorted according to their qualities of fineness, and having done this, put them into different vessels containing warm water, at the temperature of about 100 or 130 Fahrenheit; in this water dissolve about one third or one fourth of the soap which would be required to wash in the ordinary way, and to this a small quantity of pearl ashes must be added. The clothes being entirely covered with this liquor, let them remain in soak for thirty-six or forty-eight hours, after which, they are to be taken out of the liquor, and rinsed well in clean cold water, giving them a slight wringing, so that but little of the water may be retained in the clothes.

A boiler containing as much water as will cover the clothes, intended to be washed at one operation, is now to be heated to about 100 degrees Fahrenheit, and the remaining quantity of soap, (about two thirds the sum used in all), with a little pearl ashes, must now be introduced. When the soap is sufficiently dissolved, the clothes may be put into the liquor, taking care that the finer articles are all kept by themselves, and operated upon first. The temperature of the liquor must now be gradually raised to the boiling point, during a space of twenty minutes or half an hour, not faster; then let the whole boil for fifteen or twenty minutes, after which the first lot of clothes may be taken out and deposited in a vessel containing warm water. Retaining the ley from the first boil, now fill up the vessel with water, and then introduce the next coarser kind of articles, and operate upon them as above.

The clothes thus treated are then to be carefully examined, and if any spots remain, which seldom happens, they are to be washed by the hand, giving the whole a slight rub in the common way. This process of boiling, (contrary to the common prejudice,) will so effectually dislodge every greasy and dirty part, that more than three-fourths of the

business is effected without any rubbing whatever; and the clothes are ultimately rendered perfectly clean, by merely rinsing in cold water.

By these means, as I have before said, the labour and expense of washing has been greatly diminished in our establishment, and the clothes preserved from that very serious injury, which they suffer from rubbing between the hands, which separates the fibres of the threads, and destroys the fabric of the clothes, in a much greater degree than they can possibly experience by ordinary wear.

I am, Sir, yours, &c. M———

Dundee, June 26th.

Review of New Publications.

A Practical Treatise on the Law of Patents for Inventions and of Copyright; with an Introductory Book on Monopolies; illustrated with Notes of the principal Cases. By Richard Godson, Barrister at Law. 8vo. pp. 452.

This will be found a very interesting and useful work to patentees in general. The subjects contained in it are not treated with that dry formality which in common prevails throughout books explanatory of our laws. The arrangement of the different parts appears to be well methodized, and the subjects treated in a clear and familiar manner. Our limits will not permit us to give extensive quotations, and partial ones would break the thread of argument which is carried on from paragraph to paragraph; we must therefore content ourselves by mentioning the ge-

neral outline of the treatise, and recommending it to the notice of our readers.

The work commences with an introductory chapter on monopolies in general, in which very considerable research evinced, and an extensive knowledge of the laws and customs of the ancients. The subject is then brought forward to modern times, through the different leagues, and commercial treaties, and local monopolies which have prevailed in Europe. The necessity of definitive laws relative to patents is then pointed out, and the alarming height to which local and private monopolies had arisen in the arbitrary reign of Elizabeth: after which the Parliament interfered, and restrained that privilege of the Crown, confining the grant of exclusive monopolies to new inventions and discoveries in the arts, and the duration of those grants to fourteen years; by which the nature, subject, and extent was limited, and a reservation made, which gave the invention, fully and without reserve, to public use after the expiration of the term.

The views taken of patents in the eye of the common law is then considered, and the different principles upon which certain things may or may not become the subjects of patent-right.—The circumstances under which an individual may become a patentee, as being the original author or inventor, or the first publisher or introducer of a new invention or performance imported from a foreign country. —The nature of subjects connected with the manufacturing arts, which may or may not be maintained and exercised exclusively, as matters of private emolument during the term of the royal grant; in which is considered, 1st, the substance or thing made; 2nd, a new machine or instrument; 3rd, an improvement or addition; 4th, a new combination or arrangement of things already known; 5th, a new principle, method, or process, carried into effect by

existing means; 6th, a discovery in chemistry; 7th, a foreign invention.

The specification of the invention is next considered; what is therein required by a clause in the grant; of ambiguities of terms employed; omissions of essential parts; claims beyond the parts actually invented; useless parts introduced to mislead; inaccuracy of drawings; different modes or ingredients described, some of which may fail; one of several effects stated, not produced; parts or things described, not being the best known for the purpose; and general observations relative to specifications.

The process of obtaining letters patent is then described, and the different offices through which it passes. The construction of letters patent in general, and the property therein devisable only among five persons. The infringement of patent-right is next considered: what amounts to an infringement; how to be remedied at law, or at equity, in which a multitude of cases and opinions are cited, and a general view taken of the bearing of this question.

The work concludes with a treatise on copyright, and a definition of the laws relative thereto, as regards books, prints, &c.; and an appendix, containing abstracts of acts of parliament referring to the above subjects.

White's Century of Inventions or Descriptions of One Hundred Machines, relative to the Arts, &c. (see our fifth Vol. p. 153.)

The third and fourth parts of this curious work are now published. As we made our comments in a former number, upon the general matter contained in this work, it will only be necessary to state the subjects, of which these two parts consist.

Part III. with 10 Plates.

A cutting engine applied to bevil wheels.

A punch machine, for engraving cylinders for printing calico.

A differential punch machine for engravers.

A machine for moulding nails.

A fire engine.

A rotato-gyratory churn.

A helico-centrifugal machine for raising water in great quantities.

A forging machine for bar iron, steel, &c. square or figured.

A reciprocating horse wheel for mines, mangles, &c

An expanding vessel for steam-engines, pumps, blowing machines, &c.

A governor or regulator for wind mills, water mills, steam-engines, &c.

A machine for forging nails.

A mechanical assistant for the tea table.

A copper-plate press with curious and useful properties.

A reflector for light houses, &c.

A long parallel motion for mangles and other reciprocrating machines.

A mechanical syphon which expels part of its water at the upper level.

A forcing machine for taking on and off the cylinders of calico printers.

A system of machinery for cutting and trying tallow by power.

A washing machine for hospitals, which confines the offensive matter till cleansed away.

A machine for propelling boats on narrow canals without disturbing the water.

A machine for working swiftly the slide-valves of steam-engines.

Part IV. with 10 Plates.

A cutting engine for large bevel wheels, and models.

A centrifugal dash wheel for bleachers, dyers, &c.

A hydraulic lamp for the table.

A mechanical essay to derive power from expanding metals.

A machine for making lace, covering whips, &c.

A batting machine for cotton, or fine filaments in general.

A horizontal wind machine for raising water in large quantities.

A flax-breaking machine.

A bowking machine to accelerate and equalize that process.

A printing machine for two colours.

A machine for clearing turbid liquors.

Open canals employed as hydraulic machines.

A portable engine for extinguishing fire.

A wind-mill with double power.

A watch engine to extinguish incipient fires.

A machine for engraving the cylinders of calico-printers by power.

A horizontal water wheel.

A spinning machine.

Another applicable particularly to wool.

A parallel motion as applied to heavy steam-engines.

The fifth and last part of this work is expected to be ready in the course of August or September.

Novel Inventions.

Perkins's Steam-Engine.

We are far from wishing to applaud inventions that are without merit, and certainly would not lend our pages, knowingly, to support deception. We are, therefore, exceedingly annoyed at the dark and mysterious hints which are thrown at us, and the friendly regret which certain persons have expressed at the manner in which we have committed ourselves (as they say) relative to Perkins's Steam-Engine. What has been said upon this invention, has been said with every degree of caution, and certainly with a full persuasion of the truth and accuracy of all that has been advanced. In our last Number, after describing the principles of the invention set forth in the specification, we courted a philosophical investigation of the theory proposed. This has been echoed in several of the public prints, who have quoted us, and yet not a single argument comes forth on the negative side of the question. Are we then, as public reporters of the progress of art, to insinuate mysterious doubts upon a subject which has hitherto appeared to be so perfectly satisfactory; and with the approbatory testimony of several eminent engineers whom we have consulted? Certainly not. If there is any radical defect in the plan, let some one come forth and declare it; for ourselves we will be ready to take up the argument, and, if convinced, readily acknowledge that we have been deceived. But while the engine is daily in operation, is seen by thousands, and has been tried by a very considerable exertion of manual power, can we for a moment doubt that the principles are correct, and that, in due time, when a large engine is complete (several of which, we understand,

are in progress to order), the power will be proved, though, as we have before observed, perhaps not to the full extent anticipated by the inventor.

Topographical Models.

Maps in relief, or models exhibiting the undulating surface of certain portions of the earth, have always appeared to us to communicate a more natural, lively, and striking idea of the countries which they represent, than any other kind of topographical delineation. We have seen small models of this description in some of the public and private museums, which shew certain mountainous districts, in a very perfect and pleasing manner, but the largest attempt of the kind, that we know of, is now exhibiting in the Adelphi, London, which is a modelled map of that part of Syria, called the Holy Land. The surface of the country, with its different elevations, rivers, towns, and other remarkable places, are said to be here laid down with great accuracy, and occupy an area of a hundred and sixty square feet. The model has been painted to represent nature, and (as we think injudiciously) varnished; the tracks of different routes performed by the Israelites and others, mentioned in Holy Writ, are delineated with apparent exactness, and the whole presents a pleasing, and truly interesting display of that country, so memorable in the annals of sacred history.

New Fire Escape.

An apparatus has lately been invented for the purpose of enabling persons to effect their escape from the upper windows of a house which happens to be on [illegible]. The contrivance, we understand, consists of an [illegible], not differing materially in appearance from [illegible] attached to the outsides of drawing-room [illegible].

order to descend by this apparatus, a spring or bolt is to be withdrawn, for the purpose of letting down the front and bottom of the iron-work, which, in its descent, forms a ladder, by the bars sliding out of sockets, or by means of chains which previously formed part of the ornaments of the balcony: by these means persons may descend with perfect safety. The contrivance seems simple, and though we have not seen it in operation, have no doubt but that it may be made effectual.

Polytechnic and Scientific Intelligence.

Royal Society.

May 1st.—Sir Humphrey Davy, Bart., P. R. S., read a paper on the Expansion by Heat of Gases, in various states of condensation and rarefaction, being an appendix to a former paper on the application of gases, condensed into liquids, as mechanical agents.

The reading of Professor Buckland's paper on the cave of Fossil Bones, discovered in Yorkshire, was resumed and concluded. This was a very interesting paper, being a kind of summary of the results derived from the deep researches of the learned Professor into this branch of geological science. Another cave has been discovered at Kirby Moorside, and examined by Mr. Buckland and Sir Humphrey Davey; and though it did not contain a single bone, yet with respect to diluvial sediment and stalagmite, its circumstances were precisely analogous to those of the cave at Kirkdale. The paper also described a fissure of postdiluvian origin, in Duncombe Park, Yorkshire, which lies open, across the top of a lime-stone hill, and contains neither mud nor pebbles, but only the dislocated skeletons of dogs, sheep, deer, goats, hogs, &c. which had fallen in and

perished, evidently at no very remote date. The number of such fissures which are met with, filled with diluvian remains, Mr. Buckland observes, evinces that open fissures must have been much more numerous in the antediluvian state of the earth than at present; and granivorous animals, from their habit of constantly traversing the ground in the act of cropping their food, would be much more liable to fall into them, and actually more often than carnivorous animals.

A cave discovered at Wirksworth, in Derbyshire, in December, 1822, containing the entire skeletons of a rhinoceros, and the bones, horns, &c. of deer; and another at Paveland, near Swansea, containing bones of the elephant, rhinoceros, bear, hyæna, wolf, ox, horse, and a human female skeleton, with various indications of human habitations, were likewise described. The paper concluded with an examination of several hypothesis, by which the phenomena of the various assemblages of ancient remains adverted to, might be explained, shewing that the only satisfactory manner of accounting for the presence of the mud and pebbles, is to ascribe them to diluvial origin; and that, with regard to the bones, they must be divided into five classes.

1. Those of carnivorous animals, that spontaneously retired to the caves to die during successive generations, in the period immediately previous to the deluge, as in the case of the bears' bones in the caves of Germany.

2. The remains of animals that were dragged in as food by beasts of prey during the same period, as in the case of the various remains in the cave of Kirkdale.

3. The remains of animals that fell into and perished in the open fissures and caves connected with them in the period preceding the deluge, as in the case of the bones at Plymouth and Gibraltar.

4. The remains of animals that were washed in together

with the mud and pebbles at the deluge, as in the case of the entire skeleton of a rhinoceros, near Wirksworth.

5. The remains of animals that have entered caverns, or fallen into open fissures, since the period of the deluge, as in the case of the human bones in the open cave at Paveland, and the bones of dogs, deers, &c. in the open fissure at Duncombe Park.

May 8th.—Professor Oersted attended this meeting, and was admitted a foreign member of the society, and complimented by the President on his brilliant discovery of the magnetic effects of electricity, for which the society has awarded him the Copleian medal. Professor Buckland commenced the reading of a paper, giving an account of bones discovered in caves and fissures in various parts of the continent.

May 15th.—The reading of Professor Buckland's paper was resumed and concluded.

The general aspect and state of these caves, and the condition of the fossil bones and other remains found in them, confirmed all Mr. Buckland's former conclusions respecting them and the English caves. The bones found principally were those of bears, in the cave of Küblock in Franconia, and so great was the mass of black animal earth, with bones dispersed through it, that allowing two cubic feet of matter for the exuviæ of each individual, this single cave must contain the remains of at least 2500 bears, a number which may have been supplied in 1000 years by a mortality of two and a half per annum. The bones and teeth dispersed through this dust are much decayed, and readily crumble into the same dark umber-coloured powder, as that which forms the greater part of the mass in which they are imbedded.

Professor Buckland concluded this paper with some general remarks on the caves in Germany. Among which

are the following:—1. The number of caves in which bones are found is comparatively small, but where they do occur, it is generally in vast quantities. 2. Every circumstance tends to prove that the bones were already existing in the cave before the pebbles and mud were washed in by the deluge; for if the bones had been deposited at the same time, they would be found dispersed in small quantities, and lodged in numerous caves. 3. The state of the fossil bones agreeing precisely with that of those discovered in England and at Gibraltar, evinces that they were deposited at the same period, and that that period must have been previous to the deluge, is shewn by the agreement of the species of animals whose remains they contain, as the extinct hyæna, bear, elephant, and rhinoceros, occur with many other animals in diluvial gravel beds as well as in caves; while the extinct tyger is found together with the remains of horses, oxen, deer, &c. in fissures and caverns, as well as in superficial beds of diluvial gravel. 4. Professor Buckland concludes, that the inundation which destroyed these animals was transient and universal; that it covered the highest mountains, and took place at a period which cannot have exceeded a few thousand years ago.

At this meeting the reading of a Paper was commenced, entitled, An Account of a Magnetic Balance, and of some experiments on magnetism recently made with it. By William Snow Harris, Esq. Communicated by Sir Humphrey Davy, Bart., P. R. S.

Sir Humphry Davy mentioned that a paper from Mr. Parkins had been mislaid; in fact, the communication was picked from Mr. P.'s pocket whilst he was proceeding to the Society, which was intended to have been read, containing an account of experiments made by that gentleman, in which he had succeeded in reducing several of the gases

(under pressure) into a liquid form, and also of chrystallizing several of the acids by the same means.

May 29.—Mr. W. S. Harris resumed and concluded the reading of his Paper, giving an account of the Magnetic Balance, and of some recent experiments on Magnetic Attraction: At the same meeting, also, the reading of the following Paper was commenced: A case of Pneumato Thorax, with Experiments on the absorption of different kinds of air introduced into the pleura: by John Davy, M. D., F. R. S. On June 5th, the same Paper was concluded; A Paper was also read on Fossil Shells: by L. W. Dillwyn, Esq. F. R. S. communicated by Sir Humphrey Davy, Bart. P. R. S. The reading likewise commenced, of a Paper, entitled Observations and Experiments on the Daily Variation of the Horizontal and Dipping Needles, under a reduced directive Force: by Peter Barlow, Esq. of the Royal Military Academy, F. R. S. Elect; communicated by D. Gilbert, Esq. F. R. S. From the result of numerous experiments, Mr. Barlow is inclined to attribute the cause of diurnal variation, to a change of Magnetic intensity in the earth, produced by the action of the Solar rays.

A paper was also read on Bitumen in Stones; by the Hon. George Knox, F. R. S.

June 19th, was the last meeting of the Session; the following Papers were announced, on Astronomical Refraction; by J. Ivory, Esq. F. R. S.

Tables of Certain Deviations which appear to have taken place in the North Polar Distances of some of the principal fixed Stars; by J. Pond, Esq. F. R. S., Astronomer Royal, on a case of Pneumato Thorax, &c.; by John Davy, M D. F. R. S., on the Length of the Invariable Pendulum in New South Wales, by Sir Thomas Brisbane, K. C. B. F. R. S.: communicated by Captain Kater, F. R. S., in a letter to the President.

Astronomical Observations, made at Paramatta; by Mr. Rumker; communicated by the President, in a letter from Sir Thomas Brisbane.

Of the Motions of the Eye, in illustration of the uses of the Muscles of the Orbits; by Charles Bell, Esq., Part 2: communicated by the President.

On Algebraic Transformation, as deducible from first Principles, and connected with continuous Approximation, and the Theory of Finite and Fluxional Differences, &c.; by W. G. Horner, Esq., communicated by D. Gilbert, Esq. Treasurer, R. S.

On the apparent Magnetism of Metallic Titanium; by W. H. Woollaston, M. D., V. P. R. S.

An Account of the Effect of Mercurial Vapours on the Crew of His Majesty's Ship, Triumph, in the year 1810; by William Burnett, M. D.; communicated by Matthew Bailie, M. D., F. R. S.

Contributions towards a Natural and Economical History of the Cocoa-Nut Tree; by H. Marshall, Esq.: communicated by Sir James Macgregor, Bart., F. R. S.

On the Diurnal Variation of the Horizontal Needles, when under the influence of Magnets; by S. H. Christie, Esq. M. A., &c.: communicated by the President.

The President announced among other alterations in the Statutes, that in future the meetings of the Society will commence on the first of the two Thursdays preceding the Anniversary, and terminate on the third Thursday in June.

The Society then adjourned to Thursday, the 20th of November.

Society of Arts.

This Institution has published a list of premiums offered for the Session 1823-1824. The limits of this Journal not

admitting of the insertion of the whole, we content ourselves with laying a part of them before our readers, intending to resume the subject next month.

AGRICULTURE.—*The gold medal* for the greatest quantity of land gained from the sea; and for the best method of improving waste and uncultivated land. The *silver medal* for the next greatest quantity.

The gold Ceres medal for ascertaining the best method of laying down light soils to permanent grass; *the gold medal* for ascertaining the comparative advantages of certain manures; and the *silver medal* for similar experiments on a smaller scale.

The silver medal for the best method of preserving turnips, carrots, parsnips, beets, or mangel worzel, for fattening cattle. The same for the best mode of preserving drum-headed cabbages for a similar purpose.

The gold medal is offered for an object most peculiarly applicable to the present melancholy weather, the best method of harvesting corn in wet weather.

CHEMISTRY, DYING, AND MINERALOGY.—*The gold medal, or fifty guineas*, for a method of increasing the quantity or force of steam in steam-engines, with decreased expence. (The attention of our readers on perusing this will naturally turn towards Mr. Perkins and his recent inventions.)

The gold medal, or fifty guineas, for the best means of preventing the emission of dense smoke from the chimnies of manufactories.

The gold medal, or fifty guineas, for the most effectual method of preventing the ill effects arising from the noxious fumes disengaged in smelting the ores of copper, zinc, lead, tin, iron, &c.

The gold medal, or fifty guineas, for the best method of refining copper from the ore. The same for refining zinc.

The gold Vulcan medal, or thirty guineas, for a method

of making brass from British materials, so as to be equal to foreign brass. The same for the cheapest method of purifying coal gas.

The silver medal, or fifteen guineas, for the best method of making a black ink indestructible by chemical applications, and not too dear for common use. *The gold medal, or thirty guineas,* for the best method of making a superior kind of printers' ink.

The gold medal, or fifty guineas, for a cheap composition superior to any now in use, for preserving wrought iron from rust.

The gold medal, or thirty guineas, for a certain method of preventing the dry rot in timber. The same for preventing the mildew in paper.

The gold Isis medal, or thirty guineas, for the discovery of a quarry of stone in Great Britain or Ireland, fit for the purposes of lithography, equal to the stones imported from abroad.

Polite Arts.—To gentlemen under the age of twenty-five, sons or grandsons of peers or peeresses, for the best original painting or drawing of an historical subject, *the gold medal;* for the next in merit, *the gold Isis medal.* The *silver medal* and *silver Isis medal* for the best copies respectively.

To ladies under twenty-five, daughters or grandaughters of peers or peeresses. The same as the foregoing.

Manufactures.—*The gold medal* for the largest sale of Merino wool, the produce of a flock in the United Kingdom, the quantity not less than five hundred weight.

The gold medal, or thirty guineas, for the best imitation of Indian shawls, made from real Cachemire wool.

Mechanics.—*The gold medal, or one hundred guineas,* for the most effectual mode of preventing explosion in gunpowder mills. *The gold medal, or thirty guineas,* for a

method of preventing or extinguishing fires in buildings, superior to any now in use. *The gold medal, or fifty guineas,* for a mode of permanently ventilating apartments in hospitals, workhouses, &c. The same for the best mode of ventilating coal mines.

The descriptions of the various modes, &c. with certificates of their effects to be sent to the Society some time during the three or four first months of 1824, as is expressed in the printed list, copies of which are delivered gratuitously, on application at the Society's house in the Adelphi.

(*To be continued.*)

Medical Society.

This Society has announced its resolution to give annually, according to the Will of the late Dr. Fothergill, a gold medal of the value of twenty guineas, to the author of the best dissertation on a given subject, and for which the learned of all countries are invited to become candidates. The subject for the ensuing year, is "Diseases of the Spine;" and the dissertations must be delivered to the Registrar, in the Latin or English language, on or before the 31st of December next, and the Prize Essay will be read to the Society at the meeting preceding the anniversary meeting, in March, 1824, at which time the medal will be presented to the successful candidate.

Only one dissertation on the subject of "the Dropsy" having been presented for the medal for 1823, the Society has deferred the adjudication of the Prize for the best dissertation, to another year.

Royal Academy of Sciences, Paris.

Dec. 2d.—The following papers were read :—On Ani-

mal Heat, by M. Dulong: On the Use of Bronze in the making of medals, by M. Puymaurin: On the triple Compounds of Chlorine, by M. Desbretz. Dec. 9th. On the Rhinoceros of Africa, and on the Head of a fossil Rhinoceros, found near Montpellier, by M. Cuvier: On the particular kind of Double Refraction which Light experiences as it traverses Rock Crystal in a direction parallel to the Axis, by M. Fresnel.

Dec. 28.—On the Connexion between the Strength of the Sight, and the Extent of the Optic Nerves, and the Retina, by M. Desmoulin.

France.—A Society for the study of Geology, Mineralogy, and Botany of the Province of Auvergne, has recently been established at Clermont.

America.—An University has been established for the State of Virginia, by the venerable Ex-President of the United States, Jefferson, now in the 80th year of his age, at Charlotteville, near Monticello, the place of his residence. There are to be ten Professors, and apartments for 208 students.

A history of the Lichens of the genus *Licta*, by M. Dlise: On Electro-Magnectic Phenomena, by M. Montferrand: On the Application of Calculations to Electro-dynamic Phenomena, by M. Savery: On Toothed-Wheels, and their friction, by M. de Buquoi, &c. &c. A letter was also read from Colonel Lambton, dated Hyderabad, June 9th, detailing the results of his operation for measuring an arc of the Meridian in that country; and a second letter from Pondicherry, giving an account of the ordinary state of the atmosphere, and the difficulty of observing the stars at the horizon. A report of M. Magendie on a paper of Dr. Edwards, relative to the Absorption and Exhalation of Azote in Respiration, was read, and received with great applause.

SAFETY OF STEAM ENGINES.—M. Dupin, has recently read the Report of a Commission appointed to consider on the employment of high and low pressure steam-engines, principally with a view to the safety of the public. A majority of the academy have approved of the following recommendations.

1. To have two Safety valves to the boiler, one of them being so placed as not to be under the controul of the workmen, who has the direction of the engine. The other valve to be under his controul, as he may have occasion to *diminish* the pressure; whereas he would in vain attempt to increase it, because the steam would escape through the valve which be could not alter.

2. That the pressure upon the boiler in the usual working of the engine should not be greater than four atmospheres; and that the strength of the boilers should be proved by means of the hydraulic press, to a power which should as many times exceed the usual working pressure, as that does the pressure of the atmosphere.

3. Every manufacturer of steam-engines, should be compelled to declare his method of proof, and every circumstrnce tending to guarantee the solidity and safety of the machinery, especially of the boiler and its appurtenances; and to adopt means of informing persons in authority, as well as the public, of the pressure under which each machine ought to work.

4. The boilers of engines which are near any house, to be surrounded by a wall, provided the engines are sufficiently powerful in the event of accident to destroy the partition wall between such house and the establishment containing the engine.

Several minor propositions follow, such as publishing by authority an exact account of all accidents happening to Steam-engines, with the causes and effects of such events,

and the name of the manufacturer of the engine; which the report observes, would be the most efficacious of all methods to prevent the misfortunes which sometimes result from the use of steam-engines.

The Commissioners were MM. Laplace, Prouy, Ampere, Girard, and Dupin. M. Gay Lussac withdrew from the commission; his opinions differing in many points from those adopted in the report.

M. Chevreul, a French chemist, has lately analyzed the butter of cows' milk. He finds that 100 parts of fresh butter consists of

Pure butter, 83, 75.
Butter milk, 16, 25.

Linnæan Society.

May 5. Major-General Hardwick read a paper on a minute luminous insect frequently observed in the course of a voyage to India. This insect, to which the author would not venture to give a name, is three times in length by one and a half in width, is oblong, thin, and semi-transparent, and consists of nine segments, which are all provided with hairy tufts, apparently legs, and the first segment containing the head and thorax. In a bucket of salt water it remained luminous for an hour, and for some minutes in the hand.

At the same meeting, Francis Hamilton, M. D. commenced the reading of a paper entitled Commentary on the Second Part of the *Hortus Malabaricus*, which was continued on April 15th and May 6th.

Dr. Schwægrichen, Professor of Natural History in the University of Leipsic, was elected to fill a vacancy among the foreign members

May 24th. This being the anniversary of the Society,

the election of a council and officers for the year ensuing took place. The following gentlemen were chosen :—

President. Sir James Edward Smith, Bart.

Vice-Presidents. Bishop of Carlisle; A. B. Lambert, Esq.; Lord Stanley; W. G. Müton, M.D.

Treasurer. Edward Forster, Esq.

Secretary A. Mac Leay, Esq.

Under Secretary. Mr. R. Taylor.

Council. J. E. Bicheno, Esq.; E. Rudge, Esq.; J. Sabine, Esq.; R. Brown, Esq.; J. G. Childer, Esq.; A. H. Haworth, Esq.; W. S. Mac Leay, Esq.; J. Smith, Esq.

The following rare plants, from the Botanic garden at Chelsea, and the garden of the Horticultural Society, were exhibited in flower:—*Pancratium Amancaes; Hyacinthus Amethystinus; Polygala Amara; Ranunculus Parnassifolius;* and *Braya Alpina.*

A number of the Fellows afterwards dined together at the Freemasons' Tavern.

Horticultural Society.

May 6th. A paper by Chevalier J. Parmentier was read, on the pears cultivated in France and the Netherlands.

A note was read at the same meeting by Dr. Walloch, of Calcutta, relative to the rice called *Joomlah Dhan,* sent from Napal to the East India Company, and presented by the Directors to the Horticultural Society. It is perfectly hardy, and will probably be a valuable acquisition to the occupiers of low swampy land in this country. A considerable quantity was distributed to the Members present.

T. A. Knight, Esq. P. H. S. read a paper on the production of mule plants, particularly of strawberries obtained from the seeds of the scarlet and the hautboy, impregnated with the pollen of the Alpine; and a cherry produced between the Morells and the common cherry.

May 20th. The President also read a paper on an easy means of raising Peas in pots, for transplanting for an early crop in severe seasons, when the autumn crop is destroyed.

J. R. Gower, esq. read a paper on a new Hybride Amaryllis of great beauty, produced between *Amaryllis Vittatta* and *Amaryllis Reginæ*.

An interesting collection of Models in Wax, of the varieties of fruits cultivated in Italy, executed by Signor Acerbi, of Milan; and a fine collection of Double and Parrott Tulips, from the garden of the Society, were exhibited.

June 6th. The Annual Dinner was given at the Freemasons' Tavern, the president, T. A. Knight, esq. in the chair, supported by Lord Calthorpe and Sir J. S. Smith, bart., president of the Linnean Society. The dessert was very fine, notwithstanding the backwardness of the season, consisting of the choicest fruits, presented by the first gardeners in the kingdom. Sir Thomas Ackland announced, that, in future, the annual dinner would be superseded by a Public Breakfast, at the gardens of the Society, in which the ladies might partake. The suggestion was received with great applause.

New Gallery of Pictures.

We are happy to observe that a suggestion which we threw out in our late notice of the Exhibition of the Royal Academy, with respect to the establishment of a gallery for the reception of pictures rejected by the Hanging Committee of Somerset-house, has met with the most prompt attention. We understand that measures are now in progress for the erection of a Splendid Gallery, on a large scale, in Pall-Mall East, for the permanent exhibition of the works of British artists, more especially of those which fell under

the above-mentioned designation. Mr. Nash, the architect, has given in a plan of the intended edifice, which is to consist of four distinct and extensive rooms on the same floor: one for Paintings in Oil, one for Water Colours, one for Architectural Drawings, and one for Sculpture; besides a small apartment for Miniatures, &c.: the whole to be so arranged as to admit of every picture being placed in advantageous lights—a circumstance which will give the proposed exhibition an immeasurable superiority over the miserable and badly-lighted rooms of the academy, where some of the most delicate and finished works of art, such as the miniatures and medals, are placed in dark and dirty corners which would disgrace the arrangement of a puppet-show. Another advantage of the proposed building will be, that, to avoid the labour of wading up a dozen flights of stairs, as at Somerset-house, the utmost elevation of the new gallery is only to be twenty feet from the street. The expences of the building are to be defrayed by subscriptions from artists, amateurs, and others who may wish to put down their names for such a purpose, and who will be allowed an annual interest upon the sum advanced. The subscriptions are already considerable, and some of our most distinguished artists *(out of the Somerset-place monopoly)* have put down their names. Another circumstance satisfactory to exhibitors will arise from this plan. At present a very natural suspicion exists that the Hanging Committee at Somerset-house, which is exclusively composed of R. A.'s, are too partial in giving the best places at the exhibition to exhibitors of their own rank. To obviate this, the Hanging Committee of the new gallery is to be chosen annually, without regard to any other distinctions than those of taste and judgment.

On the whole, we think the proposed plan the very best that could be adopted for the bringing forward and reward-

ng merit, and, consequently, of the greatest importance to the general improvement of the arts.

Artificial Mahogany.

The difficulty of procuring mahogany, and other costly woods, and the consequent exorbitant prices demanded for the ordinary articles of family convenience, has occasioned the art of the chemist to be applied to a subject peculiarly calculated to promote domestic embellishment at a trifling expense. It has been contrived to render any species of wood of a close grain, so nearly to resemble mahogany in the texture, density, and polish, that the most accurate judges are incapable of distinguishing between this happy imitation and the native produce. The first operation, as now practised in France, is to plane the surface, so as to render it smooth; the wood is then to be rubbed with a solution of nitrous acid. One ounce and a half of dragon's blood, dissolved in a pint of spirits of wine, and one-third of that quantity of carbonate of soda, are then to be mixed together, and filtered, and the liquid in this thin state, is to be laid on with a soft brush. This process is repeated, and, in a short interval afterwards, the wood possesses the external appearance we have described. When this application has been properly made, the surface will resemble an artificial mirror; but if the polish become less brilliant, by the use of a little cold-drawn linseed oil, the wood will be restored to its former brilliancy.

New Patents Sealed.

To Stephen Wilson, of Streatham, in the county of Surrey, Esq. (in consequence of his own discoveries, and communications made to him by foreigners residing abroad), for certain improvements in machinery for weaving and winding. Sealed, 31st of May: six months for inrollment.

To John Mills, of St. Clement's Danes, in the county of

Middlesex, and of Silver-street, in the City of London, and Herman William Fairman, also of Silver-street, in the City of London, merchants, (in consequence of a communication made to them by a certain foreigner residing abroad) for certain improvements in rendering leather, linen, flax, sail-cloth, and other articles, water-proof. Sealed, 31st of May: two months for inrollment.

To Jacob Perkins, late of Philadelphia, in the United States of America, but now of Fleet-street, in the City of London, Engineer, (in consequence of communications made to him by a certain foreigner residing abroad, and discoveries by himself) for an invention of certain improvements in steam-engines. Sealed, 5th of June: six months for inrollment.

To Robert Mushet, of the Royal Mint, Tower Hill, in the county of Middlesex, gentleman, for a mean or means, process or processes, for improving the quality of copper and alloyed copper, applicable to the sheathing of ships, and other purposes. Sealed, 14th of June: six months for inrollment.

To Richard Pew, of Sherborn, in the county of Dorset, Esq., for a new composition for covering houses and other buildings. Sealed, 17th of June: two months for inrollment.

To William Vere, of Crown Row, Mile-end Old Town, in the parish of Stepney, in the county of Middlesex, engineer, and Henry Samuel Crane, of Stratford, in the parish of West Ham, in the county of Essex, manufacturing chemist, for their invention of certain improvements in the manufacture of inflammable gas. Sealed, 30th of June: six months for inrollment.

To Thomas Wolrich Stansfeld, of Leeds, in the county of York, worsted manufacturer. Henry Briggs, of Luddendenfoot, in the Parish of Halifax, in the said county, worsted manufacturer. William Prichard of Leeds, afore-

said, engineer; and William Barraclough, of Burley, in the parish of Leeds, aforesaid, for their invention of certain improvements in the construction of looms for weaving fabrics composed wholly, or in part, of woollen, worsted, cotton, linen, silk, or other materials, and in the machinery and implements for, and methods of, working the same. Sealed, 5th of July: six months for inrollment.

To George Clymer, of Finsbury-street, Finsbury Square, in the county of Middlesex, mechanic, for his invention of certain improvements on agricultural ploughs. Sealed, 5th of July: six months for inrollment.

To William Palmer, of Lothbury, in the City of London, paper-hanger, for his invention of certain improvements in machinery, applicable to printing on calico, or other woven fabrics, composed wholly, or in part of cotton, linen, wool, or silk. Sealed, 15th of July: six months for inrollment.

To Sir Isaac Coffin, of Pall Mall, in the county of Middlesex, Baronet, Admiral of the White Squadron, in consequence of a communication made to him by a certain foreigner residing abroad, for a certain method or methods of catching or taking mackarel and other fish. Sealed, 15th July: six months for inrollment.

To Bennington Gill, of Birmingham, in the county of Warwick, merchant, (in consequence of a communication made to him by a certain foreigner residing abroad) for certain improvements in the construction of saws, cleavers, straw-knives, and all kinds of implements that require or admit of metallic backs. Sealed, 15th of July: six months for inrollment.

To Stephen Fairbanks, of the United States of America, but now residing in Norfolk-street, Strand, in the county of Middlesex, merchant, (in consequence of a communication made to him by a certain foreigner residing abroad) for an invention of certain improvements in the construction

of locks and other fastenings. Sealed, 10th of July: six months for inrollment.

To John Fisher, of Greet Bridge, in the parish of West Bromwich, in the county of Stafford, iron-founder, and John Horton, the younger, of the same place, manufacturers of steam-boilers, for their invention of an improvement in the construction of boilers for steam-engines, and other purposes where steam is required. Sealed, 8th of July: two months for inrollment.

To Henry Smart, of Berner's-street, in the parish of St. Mary-le-bonne, in the county of Middlesex, piano-forté manufacturer, for his invention of certain improvements in the constructions of piano-fortés. Sealed, 24th July: six months for inrollment.

To William Jeakes, of Great Russell-street, in the parish of St. George, Bloomsbury, in the county of Middlesex, for his invention of an apparatus for regulating the supply of water in steam-boilers, and other vessels for containing water, or other liquids. Sealed, 24th of July: six months for inrollment.

To John Leigh Bradbury, of Manchester, in the county of Lancaster, calico printer, for his invention of an improvement in the art of printing, painting, or staining, silk, cottons, woollen, and other cloths, and paper, parchment, vellum, leather, and other substances, by means of blocks, or surface-printing. Sealed, 15th of July: six months for inrollment.

To Miles Turner, and Lawrence Angell, both of Whitehaven, in the county of Cumberland, soap-boilers, for their invention of an improved process to be used in the bleaching of linen, or cotton yarn, or cloth. Sealed, 24th of July: two months for inrollment.

To William Davis, of Bourne, in the county of Gloucester, and of Leeds, in the county of York, engineer, for certain improvements in machinery for shearing and dressing woollen and other cloths requiring such process. Sealed, 24th of July: six months for inrollment.

D.	H.	M.	S.	
1	0	0	0	☿ in perihelion.
1	0	0	0	♀ at her greatest elongation.
3	5	51	0	☾ in conj. with ♃ long. 3s. 0° 51′ Dif. dec. 3° 18′ ☾ 26° 28′ N. ♂ 23° 10′ N.
3	18	54	0	☾ in conj. with ♂ long. 3s 8° 2′. Dif. dec. 1° 6′ ☾ 24° 54′ N. ♃ 23° 48′ N.
5	0	0	0	☾ in Perigee.
5	14	61	0	☾ in conj. with ☿. long. 4s. 6° 30′. Dif. dec. 2° 17′ ☾ 17° 50′ N. ☿ 20° 7′ N.
6	0	0	0	⊙ Eclipsed, invisible at Greenwich. long. 4s 13° 14′ ☾'s lat. 1° 24′ 45″ S.
[illegible]	1	59	0	Ecliptic Conjunction ● New Moon
[illegible]	15	25	38	♃'s 2nd Sat. eclipsed.
9	10	35	0	☽ in conj. with ♀ long. 6s 1° 45′. Dif. dec. 3° 9′ ☽ 5° 10′ S. ♀ 2° 1′ S.
[illegible]	15	16	38	♃'st 1st Sat. eclipsed.
[illegible]	2	25	0	☽ First quarter.
14	12	29	0	☽ in conj. with α ♏. long. 8s 7° 10′ Dif. dec. 28′ ☽ 25° 34′ S. α ♏ 26° 2′ S.
15	0	0	0	☿ in conj. with α ♌ long. 4s 25° 20′ Dif. dec. 1° 49′ ☿ 14° 39′ N. α ♌ 12° 50′ N.
17	0	0	0	☽ in Apogee.
17	2	27	0	☽ in conj. with ♅ long. 9s 7° 55′ Dif. dec. 1° 24′ ☽ 25° 0′ S. ♅ 23° 36′ S.
21	6	44	0	Ecliptic opposition ● Full moon.
23	12	27	0	⊙ enters ♍ Virgo.
25	0	0	0	♀ illuminated 6 dig. on her western edge app. diam. 34″
26	13	32	38	♃'s 1st Sat. eclipsed.
27	22	46	0	☾ in conj. with ♄ long. 1s 23° 50′ Dif. dec. 6° 50′ ☾ 23° 20′ N. ♄ 16° 30′ N.
28	0	0	0	♀ in Aphelion.
28	18	18	0	☾ in quadrature entering the last quarter.
30	22	16	0	☾ in conj. with ♃ long. 3s 5° 20′. Dif. dec. 1° 54′ ☾ 24° 58′ N. ♃ 23° 4′ N.

N.B. All the above calculations are made to mean or clock time.

The waxing moon ☽—the waning moon ☾.

METEOROLOGICAL JOURNAL, JUNE AND JULY, 1823.

1823.	Thermo. Higt.	Thermo. Low.	Barometer. +	Barometer. —	Rain in inches.
JUNE.					
26	64°	45	. .	—,07	,125
27	62	50	. .	—,27	,15
28	64	46	+,12	. .	,475
29	65	48	,11	. .	,075
30	66	46	,03	. .	,175
JULY.					
1	63	51	+,08	—,01	. .
2	65	50	,03	. .	,175
3	68	47	,02	. .	. .
4	61	47	. .	—,04	. .
5	75	46	. .	—,04	,425
6	68	58	. .	—,03	,025
7	63	54	. .	—,05	. .
8	58	47	. .	—,03	,15
9	63	42	,02	. .	. .
10	70	44	. .	—,07	,2
11	73°	55°	. .	—,07	. .
12	70	52	+,06	. .	. .
13	66	56	,03	. .	. .
14	70	50	,04	. .	,275
15	66	46	. .	—,20	,025
16	66	49	,05	. .	,125
17	66	45	,10	. .	,15
18	63	49	. .	—,24	,125
19	65	51	,03	. .	,125
20	76	59	,05	—,03	. .
21	67	56	. .	—,13	. .
22	68	47	,12	. .	,025
23	66	49	. .	—,15	. .
24	66	51	,16	. .	. .
25	65	44	. .	—,14	. .

Lower Edmonton. C. H. ADAMS.

Mr. Ramage, of Aberdeen, has finished the speculum of a new reflecting telescope, fifty-three feet in focal length. The diameter of the large speculum is twenty inches.

M. Gimbernal, a learned German naturalist, has discovered in the warm baths of Aix, the presence of azotic gas, and also found out that the sulphur is discovered there in a state of volatilization, and that it is an error in the former analysis of the waters to suppose the presence of sulphuric hydrogen gas. This fact is of importance in the medical employment of the steam of the waters, which may be respired with great advantage in all pulmonary disorders.

The excavations of Pompeii are now being carried on with great spirit. Seven hundred workmen are now constantly employed in opening to the modern world this interesting relic of Rome in all its glory.

An interesting work has appeared at Nassau on Political Science, by Professor Poelitz.

A back-bone of the extraordinary length of twelve ells has been discovered on the mountain of Brovislava, in Poland. It is undergoing the examination of several scientific persons, who will publish the result of their investigation when completed.

The Turkish Government has ordered all the libraries in Constantinople to be sold *by weight*. This is a new method of estimating the value of literary works, and one which some of our own authors would be glad to see adopted in England.

Mr. E. W. Brayley, Jun. will shortly publish the Natural History of Meteorites which have at different periods fallen from the atmosphere.

M. Champollion, well known by his discoveries relative to the Egyptian hieroglyphic writing, has announced his intention of publishing a work on that subject, to be called the Egyptian Pantheon.

M. Humboldt, the celebrated traveller, has in the press a Geognostical Essay on the superposition of rocks in both hemispheres.

Mr. J. R. Young is about to publish an Elementary Treatise on Algebra.

The following experiment, which pleasingly illustrates the formation of haloes, has been given by Dr. Brewster :—Take a saturated solution of alum, and having spread a few drops over a plate of glass, it will rapidly crystallize in sm octohedrons, scarcely visible to t When this plate is held between server and the sun, or a candle, v eye very close to the smooth side glass plate, three beautiful haloes will be seen at different distanc the luminous body. The inn which is the whitest, is formed images refracted by a pair of f the octohedral crystals, not m clined towards each other ; the halo, which is more coloured, w blue rays outwards, is formed by of faces more inclined ; and th halo, which is very large and hi loured, is formed by a still more i pair of faces.

GAS LIGHTS.—The following ment will shew the wonderful p made by the Gas Light Companie few years that have elapsed sinc establishment. The length of already lighted with gas in Lo 215 miles! and the three princip panies light 39,504 public lam consume annually about 33,15 drons of coals!

We have read with much in work on *Medico-Electricity*, by Adams ; and we should venture observations on its novelty and n we were not in hopes of being give something on the subject next from the pen of the ingeniou himself.

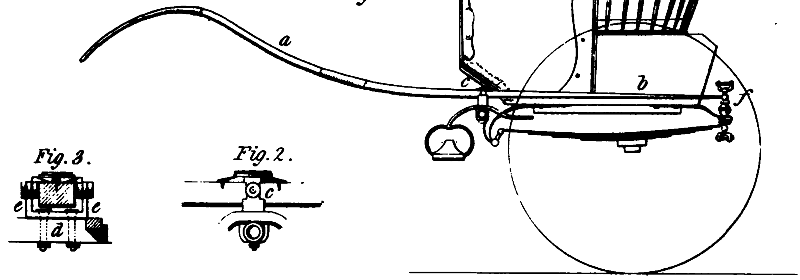
An interesting volume on Pyr will shortly be published by and Marshall.

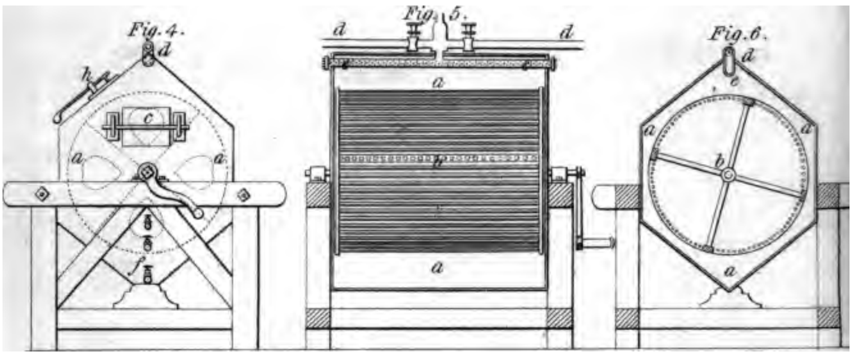
Mr. Granville Penn has recent lished a work called a Comparati mate of Mineral Geology, whic the slight view we have been en take of its contents, appears t serving of public attention. We however, help commenting upon extraordinary criticism given of th by the Editor of the Quarterly of Science, who, not content tolling the author, and loading h unmerited compliments, draws a rison between Mr. Penn's theo that of M. de Luc, the latter of denounces as *trash!* Upon co the two works, however, it will that Mr. Penn's theory is not same in substance with M. de I in many instances his sentences a phrases upon that author.

LONDON:
SHACKELL AND ARROWSMITH, JOHNSON'S-COURT, FLEET-STREET.

Fullers Improved Carriage Shafts.

Fig. 1.





Smiths Washing Machine.

Fig. 10.

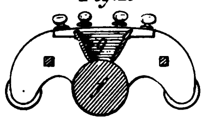


Fig. 9.

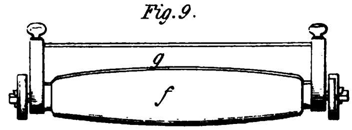
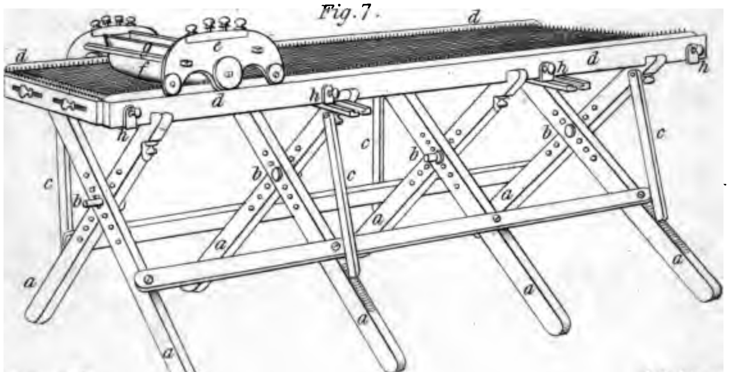


Fig. 8.

Wickhams Apparatus for Dressing Lace &c.

Fig. 7.



W. Newton delt.

S. Bellin sculpt.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. XXXIII.

Recent Patents.

To Thomas Fuller, *of Bath, in the County of Somerset, Coach-builder, for an Improvement in the construction of Shafts, and the Mode of attaching them to Two-wheeled Carriages.*

[Sealed 18th February, 1823.]

The design of this improvement is to prevent that unpleasant vibratory action to which a one-horse-chaise is subject, commonly called *knee-motion*, produced by the rising of the horse in stepping forward. The invention embraces two points; first, the peculiar construction of the shafts, and secondly, the mode of attaching them to a two-wheeled carriage. In ordinary single-horse carriages going upon a pair of wheels, the shafts are vibrating levers moving up and down upon the axletree as a fulcrum, and consequently giving to the fore part of the carriage that unpleasant knee-motion above alluded to. This action is prevented in the

improved carriage, by rendering the hinder part of the shafts elastic, and affixing them to the drawing-bar by means of shackles with pivots, upon which, (instead of the axletree) as fulcrums, the shafts vibrate, and thereby communicate the up and down motion of the horse to the elastic part of the shaft beyond the drawing-bar; while the body of the carriage, being suspended in front to the fulcrum, and behind to the extremity of the elastic shaft, escapes the vibratory action of the shaft, and is subjected to no other motion but that which is communicated by the elasticity of the springs as the carriage passes over temporary obstructions.

Plate VI. fig. 1, is a side view of a gig, or two-wheeled carriage upon the improved plan; *a* is the ordinary drawing-shaft; *b* a continuation of the shaft, rendered elastic; *c* the shackle-joint, or fulcrum, upon which the shaft vibrates. This shackle is rendered more evident by the enlarged representation, fig. 2, and by the cross view, fig. 3, in the latter of which the shaft is represented as cut off. In section *d* is the drawing-bar, upon which the staple *e*, is secured by screw bolts, or otherwise, to the shaft. The upper part of the shackle is fastened to the shaft by screws or otherwise, and pivots pass through eyes in the staple and also in the shackle, and thereby connect them together.

By reference to fig. 1, it will now be seen that when the action of the horse raises the fore part of the shaft *a*, the hinder part *b*, will be depressed, the central part being held by the fulcrum-joint *c;* and in a similar manner the depression of the fore part of the shaft *a*, causes the hinder, or elastic part *b*, to rise. The ordinary shackle attached to the end of the back-rail, or spring, at *f*, supports the extremity of the shaft *b*, and thus, by means of the shackle-joint, or fulcrum *c*, the vibratory motion of the shaft is dissipated.

At the back part of the carriage there must be a cross spring, to which the extremities of the elastic shafts *b*, are to be attached, or a back rail will answer the purpose, but a spring is to be preferred; the shafts are proposed to be made of lancewood, rendered flexible by being gradually reduced in substance from the fulcrum point at *c*, to the extremity of the hinder part, but any other material may be used which may be found applicable to the same purpose.

A gig with the improved shafts can with facility be converted into a curricle, the shafts being easily removed by taking out the screw-pivots and the bolts from the hinder part; when a pole may be attached by two sockets in the centre, and splinter-bars for two horses to the shackles *c*. This is a convenience which has hitherto been obtained by much additional weight, and an unsightly appearance, but in the present instance it can be effected without either of these objections. It is also found that a horse works with much more ease in the improved shafts, as, by their flexibility, they accommodate themselves to his action, and therefore are not so likely to break as common shafts.

The simple and secure method of attaching these shafts to the carriage allows them to be disengaged without difficulty, and affords a great convenience in packing for exportation, as the whole of the body and springs can be inclosed in a case, and the shafts stowed away in any convenient part of the vessel. Spare shafts can also be provided to suit any favourite horse which happens to be below the height of the horse usually driven in the gig; these may easily be substituted for the ordinary shafts when required, and the carriage rendered complete for either, at pleasure.

The patentee concludes his specification with these words: "Having thus described my invention, in connection with

such other appendages as are necessary to render the whole clearly understood; I wish it to be observed, that I rest my claim of invention to the introduction of the elastic hinder parts of the shafts, and the employment of the shackle-joints, as above described."

[*Inrolled, April,* 1823.]

To Junius Smith, *of Old Broad-street, in the City of London, Merchant, for certain Improvements on a Machine for Washing, Cleansing, and Whitening Cotton, Linen, Silk, and Woollen Garments, or Piece Goods.*

[Sealed 20th January, 1823.]

The patentee states, that a machine heretofore employed by dyers, called a *wash-wheel,* bears some resemblance to the one under consideration; but the improved construction and adaptation of the present machine embraces many advantages over the wash-wheel, and every other description of washing machine hitherto employed, both in the process of bleaching of piece goods, and also in the cleansing of garments in the laundry. The improved apparatus is particularly designed for washing of wearing apparel, and, from our own observation of the process employed, appears to perform its business in a very perfect manner. It consists of an angular steam-tight vessel or chest, within which is a revolving cylindrical barrel, formed of ribs, with open spaces between; in this barrel the clothes are to be placed, and steam is admitted from a boiler, by a pipe, to the interior of the barrel, which steam penetrates through the clothes, and, as they are turned over by the revolution of the barrel, they occasionally dip into warm water, or an alkaline solution in the bottom of the chest, by which they

become perfectly washed and cleansed from all dirt or other impurities.

Plate VI. fig. 4, is an external view of the end of the machine; fig. 5 is a section of the box and frame work taken lengthwise, shewing the barrel within; and fig. 6 is a cross section of the box and barrel, cut across the middle in the direction of fig. 4; the same letters refer to the same parts of the apparatus in each figure.—*a a* is the close vessel, or steam-tight box, which is proposed to be made of copper and supported in a wooden frame; *b* is the revolving cylinder or barrel, the periphery of which is formed of ribs or rods of wood or metal. This barrel is divided into several compartments by rails or bars, as seen in the section, fig. 6. The clothes, piece goods, or other articles intended to be operated upon, are introduced to the different compartments through the apertures in the end of the barrel, shewn by dots in fig. 4, access to which is obtained by the means of the door *c*; *d* is a pipe with stop-cocks, by which steam, hot water, cold water, or any solution may be admitted to the interior of the vessel.

The barrel being occupied with the articles of wearing apparel, or other goods, about to be washed, and the external vessel closed steam-tight, a cock of the pipe *d*, is to be opened, and a quantity of alkaline solution admitted to the internal pipe *e*, which extends along the top of the steam-tight vessel, from whence the fluid descends in a shower over the barrel and the articles within. When a sufficient quantity of the alkali has been introduced for the purposes of the operation, the cock is closed and another opened, by which steam from a boiler is allowed to pass through the pipe *e*, and thereby fill the interior of the closed vessel.

The cylinder or barrel may now be turned by means of the winch, or it may be made to revolve by geer attached

to the centre shaft, and communicating with any first mover. By thus turning the barrel, the goods will be so perfectly acted upon by the steam and alkali throughout the whole, that all impurities will be driven off into the liquor below, which process will generally require about the space of one hour, a safety-valve *h*, being introduced in any convenient situation to prevent accident. The foul water and alkali is now to be drawn off by the lower cock *f*, and clean warm or cold water introduced by one of the cocks from the pipe *d*, above, by which the articles will be rinsed and rendered perfectly clean.

By this mode of washing it will be perceived that the goods are merely turned over, without being subjected to any kind of rubbing, the whole operation being effected by the fluids in the vessel, without touching the goods by hand after they are introduced into the cylinder, until they are finally removed in a perfectly cleansed state. Solutions of any required strength may be thrown upon the goods while in motion, and steam of any degree of heat and pressure applied, according to the nature of the articles to be operated upon. The specification further states, "It is also to be remarked, that there will be little or no loss of alkali or heat by this process; the former is preserved and evaporated for further use, and the heat of the steam may be conducted off to the drying-rooms in pipes."

These machines are calculated to wash, upon a large scale, either goods in the manufactory, or wearing apparel in an extensive establishment; they are, however, equally well adapted to reduce the labour of washing in every family; and as the steam required for the operation need scarcely ever exceed a pressure of one or two pounds upon the inch, the steaming apparatus commonly employed for cooking may be made perfectly effective by a pipe con-

ducting from the ordinary boiler to the machine, which, if made about three feet square, would be sufficiently portable, and might be placed in the kitchen or laundry during the operation, and removed to any convenient situation out of the way when the business is finished.

[*Inrolled, July*, 1823.]

To John Mills, *of St. Clements Danes, in the County of Middlesex, and of Silver-street, in the City of London, and* Herman William Fairman, *also of Silver-street, in the City of London, Merchants, (in consequence of a Communication made to them by a certain Foreigner residing abroad) for certain Improvements in rendering Leather, Linen, Flax, Sail-cloth, and other articles, Water-proof.*

[Sealed 31st May, 1823.]

The patentees state, that a great objection exists to the present mode of preparing tarpaulins and other coverings for ships, &c. from the stickiness of the materials employed in rendering the fabric water-proof, which causes the surfaces to adhere when laid together, particularly in warm climates or hot weather. In the preparation of oil-cloths, likewise, an objection occurs from the paint applied in the process becoming stiff when exposed to the air, and consequently cracking and peeling off. The composition herein proposed is stated to obviate both these objections, as it becomes sufficiently hard and dry to prevent stickiness, yet retains a desirable degree of pliability, without any disagreeable smell, and penetrates the threads and the interstices between them without injury to the texture of the fabric.

The compound employed by the patentees consists prin-

cipally of pipe-clay and oil varnish, with a small quantity of other ingredients, of which the following are the proportions :—" In the first instance the varnish is prepared by mixing linseed oil at the rate of one hundred pounds with six pounds and a half of saccharum saturnæ, one pound and a quarter of burnt umber, one pound and a quarter of white lead, and one pound of fine pumice-stone." All these articles being previously well pounded and ground, are to be boiled together with the oil for ten hours, over a slow fire, taking care that the heat be gradually increased during the last two hours, but not allowing the oil to become thick, which it is liable to do if not attended to. A knowledge of this part of the process can only be perfectly acquired by experiment and observation, as much depends upon the quality of the oil employed, which, if adulterated, is very apt to coagulate. The oil varnish, when prepared with the ingredients as above, should remain in such a state of fluidity that if mixed with one third its weight of pipe-clay, it would then have only the consistency of molasses.

After the prepared varnish has been suffered to settle for at least a week, it is to be strained off through muslin into a clean vessel; then a quantity of pure pipe-clay, pounded and sifted, equal in weight to one-third of the prepared varnish, is to be put into a tub or other vessel, and gradually mixed up with a quantity of thin glue until it has assumed the consistency of salve; after which the varnish is to be added, and perfectly mixed by stirring with a wooden spatula. When these articles are perfectly mixed in the proportions above stated, the whole is to be ground in a colour mill, which operation may be performed several times over, until the preparation runs out of the mill in a fluid state.

In this process any colour may now be given to the com-

position, by grinding oil-colour with the above prepared varnish, which may be added in the proportion of one quarter colour to three quarters of the composition.

The linen, or other articles, having been extended in wooden frames, the composition is to be spread on the surface of the fabric with large knives, which are recommended to be made of cast steel, three inches wide and eight inches long. The composition will now soak into the cloth and fill up the interstices, and when set will leave a smooth surface on the outside. The frame on which the cloth is distended may now be turned over, and the other side of the fabric operated upon as above; after which the frame may be put in a convenient situation to dry for the space of about a week, at the expiration of which time the prepared fabric may be removed from the frame, and is ready for use.

Canvas, linens, and calicos prepared in this manner are found peculiarly well adapted as substitutes for tarpauling, for awnings, coach-top covers, boat-cloaks, sea coats, and a variety of other articles requiring to be made water-proof. The same preparation is also applicable to leather articles, such as boots and shoes, and a gloss may be obtained upon the surface of the goods by the following means, the invention of which is also claimed by the patentees:—Fifty pounds of the above prepared varnish is to be gently boiled with five pounds of clarified rosin, until the rosin is dissolved, and when cooling, two pounds of turpentine is to be added to it. Any colour corresponding with that already on the goods must then be well ground and mixed with the varnish, which, when strained through muslin, as described, is ready for use.

When the preparation is perfectly dry upon the fabric, the surface may be rubbed down with pumice-stone and water, and after being well washed, must be suffered to dry

again. Two or three coatings of the last-mentioned composition (which may be called a japan) are then to be laid on successively with large brushes, each distinct coating being suffered to dry for two or three days, by which means the japan will become perfectly hard, and present a polished surface.

[*Inrolled, July,* 1823.]

To Charles Broderip, *of London, Esq. but residing at Glasgow, for his Improvement in the construction of Steam-Engines.*

[Sealed 5th December, 1821.]

The improvement herein described is divided into three parts; first, in those steam-engines which have their working cylinders placed in a horizontal position, and their lower parts not being connected with the condenser, it is proposed to place a pipe, or several pipes, leading from the lower part of the interior of the cylinder, the outer extremity of which pipe is to be closed by a valve, and that valve loaded with a weight rather greater than the pressure of the steam within the cylinder: this weight keeps the valve closed until an accumulation of water happens to take place within the cylinder, by which an increased pressure is produced, when the valve opens, and the water is allowed to escape In some cases it may be found desirable to load these valves with a weight considerably greater than the pressure of the steam in operation, under which circumstances it will be necessary to open the valves by hand occasionally, in order to permit the condensation to be discharged ; this must also be done in starting the engine. If two pistons work in the same cylinder, an additional pipe of the above description, with a valve at its outer extremity,

must be placed near the middle of the cylinder, or where the two pistons meet.

The second contrivance is a rod set into the bottom of the cylinder, and standing up or along in the axis of the cylinder, upon which the piston is to slide. In this case the piston-rod must be made hollow, with a bore of sufficient diameter and length to receive the rod first mentioned. If two pistons are to work in this cylinder, the rod must be fixed in the middle by a cross bearing, and extend from thence in the axis of the cylinder towards each end, the pistons being connected to hollow rods, as above described.

Thirdly, when the cylinder is placed in an horizontal position, an additional cylinder and piston is proposed to be connected to the larger cylinder, the diameter of the lesser being about half that of the greater. A steam-pipe is to lead to this small cylinder, and it is to be connected to the condensing apparatus of the large one. The rod of the small piston is also to be connected, by levers and rods, to the crank of the fly-wheel, and the arrangement of the action is to be such, that when the larger piston is at the end of its stroke, the small piston shall have proceeded but half way, and when the small piston is at the end of its stroke, the larger one shall be half way. The addition piston is to be connected with the working-geer of the valves, so that the whole may be thrown in or out of geer together.

The object of these improvements is not mentioned, nor their advantages, neither are there any descriptive drawings, it is therefore to be presumed that these points are sufficiently obvious by the literary detail.

[*Inrolled, May,* 1822.]

To Thomas Wickham, *of the Town and County of the Town of Nottingham, Lace Manufacturer, for a Compound Paste or Liquid, to be used for the purpose of improving and colouring Lace and Net, and all other manufactured Articles made of Flax, Cotton, Wool, Silk, or any other Animal or Vegetable Substances, whether the fabric of the same be composed of holes or interstices, or of open or closework, or otherwise; and to be applied in the process of getting up, dressing, or colouring the same.*

[Sealed 24th March, 1823.]

The article to be produced by the application of this compound paste to lace or other fabric, is called *French foundation.* The patent appears to be for the application of this paste to the different fabrics mentioned above, in order to produce the said article, *French foundation.* The paste is to be made by combining the following ingredients in the proportions stated:—Of the best rice, ground and finely sifted, take four pounds; of white sugar-candy, pounded and sifted, eight ounces; of pulverised arrow-root, eight ounces; of spermaceti, two ounces. These are to be mixed together, and converted into a mucilage by the addition of four gallons of water; the whole is to be boiled for half an hour, agitating it all the time, when the paste will be produced, by which the said *French foundation* is to be effected.

The lace, whether of flax, cotton, silk, or other fabric, is to be extended upon a stretching-frame, previous to receiving the paste. This stretching-frame is formed of wooden rails attached together by screws, having small pins or tenter-hooks set round, by which the edge of the fabric is to be held.

Plate VI. fig. 7, shews the whole of the apparatus, as

in operation; it consists of a stand formed by a series of legs, *a a a a*, which opens upon joints *b b*, and are set to any required expanse by the props *c c*. On the top of this stand the stretching-frame *d d*, is placed, and is fastened thereto by screws. The legs of the stand are contrived to suit every width of the stretching-frame that may be required for different articles, by shifting the fulcrum pins *b b*, higher or lower.

In employing this apparatus, the legs are first to be opened to any convenient width, and fixed in that situation by the props *c*; then the side-rails (a section of which is shewn at fig. 8) are to be placed upon the top of these legs, resting in the notches, and secured by thumb-screws. The selvages of the lace are then put upon the tenter-pins, and when the end-pieces of the frame have been attached, the props are shifted, and the frame stretched out to its required width. The fabric is now ready to receive the paste, which is to be deposited by the roller of the carriage *e*.

Fig. 9 is a front view of the carriage, and fig. 10 a cross section, shewing the paste trough *f*, and roller *g*. The trough *f*, being filled, or nearly so, with the paste above described, the carriage is placed upon the stretching-frame, its wheels running upon the edges of the rails in the outer groove, seen by the section of the rail, fig. 8. The carriage is now made to traverse over the fabric, and in so doing the paste flows from the bottom of the trough *f*, on to the periphery of the roller *g*, and as the roller advances it deposits a thin coat of the paste upon the fabric.

The stretching-frame being kept distended by clamps and cross-rails *h h*, may now be removed from the stand by turning the thumb-screws, and the fabric may be set apart until dry. This process is intended to be repeated about five times, allowing the paste to dry between each, when

the French foundation will be produced upon the fabric. Colour may be introduced into the paste for the purpose of giving a hue to the lace, and the paste, if it should become too thick, may be thinned by the addition of water, observing that it should be boiled every time fresh water is added.

It will be seen that the periphery of the paste-roller is curved, which is designed to suit the bagging of the fabric when wetted, but if a straight cylindrical roller should be preferred, a bearing board must be introduced under the lace, which may rest upon the inner ledges of the side-rails, in which case it would be desirable to introduce turn-buttons under the bearing-board, by which it may be raised up to the fabric previous to the operation, and lowered away from it when the operation is complete. But this method is not considered to be so eligible as the curved roller, without a bearing-board.

[*Inrolled, May*, 1823]

To Stephen Wilson, *of Streatham, in the County of Surrey, Esq. for a new Manufacture of Worsted.*
[Sealed, 18th October, 1822.]

In order to produce this new material, which is a kind of crape for ladies' dresses, and is denominated British Crape, two wefts of worsted, spun particularly hard, are to be shot into an ordinary warp of worsted, silk, or other material. These wefts are directed to be spun from five to seven times harder than for ordinary weaving, and that in contrary directions, upon spindles which respectively turn to the right and left.

The warp employed should be about one-third finer than the weft intended to be used, and set in the loom rather

open; the weft is to be composed of double threads, spun as above-said, particularly hard. The alternate shoots are to be made first with weft spun to the right, then with weft spun to the left, and very slightly beaten by the batten.

Any desired quantity having been thus produced in the loom, it may be cut out in lengths, and is then to be put into boiling water, by which it will shrink and crape up to about three-fifths of its original width. Next, having been stretched out upon a roll to about two-thirds its first dimension, it is to be scalded in the usual manner, and if shrunk when dry, is again stretched out, and then scalded by steam, so that its colour may not be injured.

It is not material that the respective shoots be made of two yarns twisted the same way; two yarns twisted contrary ways may be shot together; but that mode which is considered to be most eligible, is alternately to shoot two yarns, both twisted the same way. Neither is the size of the material limited; but those yarns which are recommended to be used, are from No. 30 to No. 60 of the four-quarter reel.

[*Inrolled, April,* 1823.]

To William Jones, *of the Parish of Bedwellty, in the County of Monmouth, Engineer, for certain Improvements in the manufacturing of Iron.*

[Sealed, 18th October, 1822.]

The improvements proposed herein apply to that part of the manufacture of iron called puddling, and consist in re-heating the refined iron, or the metal pigs, in a crude state, by introducing them into a stove connected with

the furnace, previous to placing them in the puddling furnace. This stove may be either attached to the puddling furnace, and heated by the same fire, or detached from the furnace, and heated by a distinct fire.

After the refined iron, or metallic pigs, have been so heated, they are to be placed in the puddling-furnace in their heated state, by which the process of puddling will be considerably assisted, and the charge of iron wrought into balls, ready for the hammer, in much less time than by the usual mode of putting the refined iron, or metallic pigs, into the furnace in a cold state.

By this mode of heating the iron previous to its introduction into the puddling-furnace, a considerable saving of fuel is effected in comparison to the mode of puddling iron heretofore practised.

[*Inrolled, December,* 1822.]

To William Johnson, *of Great Tothan, in the County of Essex, Gentleman, for a Means of obtaining the Power of Steam, for the use of Steam-Engines, with reduced expenditure of Fuel.*

[Sealed January 8th, 1823.]

This patent, if we rightly understand the specification, is for an extension of the views taken in a former patent for the same invention. The peculiar construction of boiler herein described was considered in the original specification as eligible for generating steam for the supply of steam-engines, of whatever construction, without exposing so great a surface to the direct action of the fire, and thereby preventing the wear of the boiler. In the present instance it is only claimed under the idea of saving fuel.

The boiler is proposed to be constructed of a cylindrical form, with spherical ends, and placed in an erect position, but to be divided into several chambers by horizontal

partitions. That is, the first chamber, or lower part of the boiler is formed as half a globe, with the sides rising a little above the hemisphere in a cylindrical form; the second chamber is a cylindrical vessel with a flat bottom, exactly fitting on to the top of the first, and fastened thereto by flanges and bolts, with proper luting, to make the first chamber steam-tight. Another vessel, exactly like the last, may be attached on its top, and bolted and luted as before, by which the second chamber may be made steam-tight. Thus several vessels may be combined and covered in at top with a cap, bolted and luted, so as to produce a compound boiler of the form described, that is, with the capability of generating steam in each distinct chamber.

Pipes leading from a cistern are to conduct water to the several boiling chambers, and other pipes leading from these chambers are to convey the steam into an ordinary waggon-boiler or steam reservoir. Safety-valves must of course be placed in each chamber, to prevent any increased pressure of the steam from exploding the vessels, and cocks must be placed upon all the pipes to regulate the supply of water in the boilers, and the discharge of the steam.

The cylindrical boiler, constructed of the several vessels, as above described, is to be placed in an upright position, with the furnace under the lower end, by which the immediate action of the fire will cause the water in the lower vessel to boil, from whence the heat of the steam will ascend through the bottom of the second vessel, and after causing that to boil, will pass up to the third vessel, and so on through the whole range of the boiler, steam being generated in the several chambers by the heat emitted from the fire below, after passing through each vessel of water. The sides of the cylindrical boiler are to be enclosed with any material that will not readily conduct away heat, and

the flue of the furnace may be made to wind round the boiler, and pass over the top chamber. By this construction of boiler, and the mode of passing the heat upwards from one vessel to the next above it, the patentee considers that the quantity of fuel required to heat a boiler of the entire capacity of the chambers combined, will be considerably economised, and a greater quantity of water evaporated by a given quantity of fuel, than by any other construction of boiler heretofore employed.

[*Inrolled, July,* 1823.]

Original Communications.

To the Editor of the London Journal of Arts and Sciences.

Dowlas Iron Works, Merthyr Tydfil,
5th August, 1823.

SIR,

I have been anxiously expecting the publication of this month's number of your Journal, in the hope that some of your correspondents who may have seen Mr. Perkins's steam-engine in operation, and who could take an impartial view of its principles, would have given us their ideas of its merits or defects. I am, however, much disappointed that no one has thought it worth while to enter upon the subject, and particularly so, as I am at a loss to perceive its advantages over the common high-pressure engine.

The following comparative estimate of the risk of explosion in raising steam of great expansive power on the old plan, and on Mr. Perkins's plan, has been drawn out for the purpose of endeavouring to clear up a delusion which many labour under, in supposing there is no danger

in using his steam-engine. If you will allow it a place in your valuable Journal, I shall feel obliged.

It is not pretended to be mathematically correct, but is considered to be an approximation to the truth, sufficiently near for the purpose which I have above stated.

Let us suppose a boiler to be erected something on Mr. Woolfe's principle, consisting of several tubes filled with water, and placed horizontally across the furnace, and submitted to the direct action of the fires, and that these tubes were in connection with a steam-vessel, in which the steam should collect until it arrived at its required expansive power,—say 173 lb. per square inch. This would require the temperature of the water to be about 500 degrees, which is rather higher than what you state it to be in Mr. Perkins's generator. It is here evident, that 173 lb. per square inch, on the area of this boiler, is the power which the materials composing it must resist, to prevent an explosion.

Let us now take a view of his generator. In the first place, the valve which is fixed upon it, and through which the hot water escapes, is loaded to the amount of 34 atmospheres, or about 500 lb. per square inch. This valve at every stroke of the engine, is elevated by the action of a forcing pump, which displaces a quantity of hot water equal to the quantity of cold water which it throws in, and this of course, of itself, must produce a pressure acting on every square inch of the internal area of the generator, equal to the load above mentioned on the valve. This is, however, not all,—there is, also the expansive power of the steam in the steam-pipe, acting upon the valve, and which must of course be overcome before it can open. This, allowing the water to be of the same temperature as in the other boiler, will produce a pressure amounting to 173 lb. making a total pressure on

the internal area of the generator, at every stroke of the engine of 673 lb. per square inch, to gain an effect only equal to that produced by the other boiler, with a pressure of only 173 lb. on every square inch of its area.

From the published reports of the effect of the steam produced by the generator, I am well aware it will be immediately said, I have underrated its power in stating it to be so low as 173 lb. If, however, the temperature of the water in the boiler does not exceed 500 degrees, the expansive power of the steam generated by it cannot exceed that, as steam produced at that temperature will only support a column of mercury, whose altitude is 353 inches, now $353 \cdot 77 \div 30 \times 14 \cdot 75 = 173 \cdot 90$ lb. for the pressure per square inch.

If, however, the steam so formed, does really exert a greater power, it must arise from a cause not hitherto investigated. Will water, (say at a temperature of 500 degrees, and under a pressure of 1000 lb. per square inch,) enter into combination with a larger portion of caloric in a latent state, than a similar quantity of water at the same temperature, will, under a pressure of only 500 lbs. per square inch? If this is the case, it will account for any increase of powèr which may be gained, by supposing that immediately as it escapes from under the higher pressure to the lower, that the heat which was in combination with it in a latent state, becomes thermometric heat, thereby increasing the effective power of the steam.

This is, however, very improbable, and completely contrary to established facts,—it being well known, that percussion or violent compression of any kind, causes the liberation of latent heat both from solids and fluids, and that if any difference in the known laws of heat exists, in the present instance, it remains as yet to be proved.

I consider that my doubts are further strengthened by

the uncertainty which appears to exist, respecting the actual power of the engine, and particularly so as it is admitted on all hands that its effect is not fully equal to what was expected.*

In the twenty-eighth number of your Journal, you state, that the perfect safety from any disastrous consequences attendant upon an accidental explosion, have been fully proved, by actually bursting the apparatus several times, in the presence of many persons. This I do not mean to dispute, a weak place is left in the steam-pipe, in which the quantity of steam is so small that no one could for a single moment suppose that the consequences of an explosion would be very serious,—but has the GENERATOR been burst? Let Mr. Perkins leave a weak place in that, which shall give way under a certain pressure, and allow the water to escape from it, and let us see what the effect of that will be. If the water in the generator is at a temperature sufficiently high to fly into steam in the steam-pipe the moment it enters it, and which is said to produce such very extraordinary effects,—will these effects be less when permitted to take place in the open air: of this there can be no doubt, and that they will be equally dreadful with the effects produced, by the explosion of a common high pressure steam-boiler, in which the steam is allowed to form on the surface of the water.

I am, Sir, your very obedient Servant,

W. [illegible]

There are some erroneous conclusions drawn by our correspondent, which we do not think ourselves justified in correcting, until the specification of the [illegible] is Inrolled; the mode of *generating steam* [illegible]

* We beg to say Mr. Perkins does not admit [illegible]

is the only part of the subject at present before the public.

To the queries of our correspondent, respecting the consequences attendant upon an explosion of the generator, we beg to reply, that *three of the generators have been burst under the extreme pressure to which they have been submitted, without any disastrous consequence whatever.* Two of them we have examined minutely; in the first, the bottom, a thickness of two inches, and three-eighths of metal, gave way and cracked open in two fissures, at right angles; the other rent open two fissures, parallel to each other, two inches apart in the side of the cylinder. The cracks were about the sixteenth of an inch wide, and fifteen inches long; but nothing like explosion took place in either case. The fire was merely extinguished in both instances.—Ed.

To the Editor of the London Journal of Arts and Sciences.

Birmingham, August 20, 1823.

Sir,

Understanding, by a friend, that some ignorant person, unknown to me, who describes himself as connected with the Society of Arts, has very impertinently thought proper to publish an account of what he considers to be the process of uniting the edges of thin sheet iron, as practiced at the Britannia Works; I should feel obliged, if you will, in the forthcoming number of your Journal, contradict his mis-statements, and assure your readers, that the process is simply and literally *welding* the edges of the iron together, and *not soldering* them, as the sapient writer above alluded to, so pertinaciously insists upon. The process described by you, in page 311, Vol. V, of the London

Journal of Arts, is perfectly correct. The iron is raised very little above what is usually understood as *a red heat*, and the material employed as a flux does not contain any metallic substance whatever.

I cannot conclude without expressing my entire concurrence in the opinion which you so pointedly gave, that the person in question would not write any the worse if he happened to understand his subjects, &c.

Your obedient servant,

J. WILLOUGHBY.

Having given the particulars of this novel process of welding, with considerable care and exactness, in our number for June last, we should have thought the vulgar abuse of the writer above alluded to beneath our notice, if the firm of Hancorn, Willoughby, and Co. had not felt themselves aggrieved. Having therefore again touched upon the subject, we beg to add to our former statement, that the welding of thin pieces of iron and steel together at a temperature very little above red heat, has been long practised in America, (as we are informed by Mr. Clymer,) and that the material there employed as a flux, was the ashes of *hiccory** wood, pulverised and mixed with common salt.

This, however, is not the material alluded to as a flux in our former statement, and as we then observed, the discovery being considered a valuable secret by the few persons who possess it, we do not feel ourselves justified in publishing that which was communicated to us in confidence.—ED.

* A tree used as a common fire wood in America.

Panton on an Erroneous Description of his Invention.

Our readers need scarcely be informed, of our readiness at all times to communicate the comments of Patentees respecting any erroneous description of their respective inventions, which may have unguardedly escaped us, or in explanation of any false conclusion, which we may have formed from our own conception of the subject. A verbal communication has lately been made to us by a Mr. John Barton,* formerly of Falcon Square, Cripplegate; but now, as we understand, of Seward Street, Goswell Street, St. Luke's, complaining of an inaccurate description of his patent, given by us in our number of November, 1820, (vol. I, page 421.) Though three years have elapsed, since its publication, we expressed ourselves perfectly ready to correct any error, and for that purpose requested a sight of the original specification, or the favor of Mr. B's own remarks in writing, which accordingly we fully expected.

Our surprise may be better conceived than described, when we learned, within two days after the above mentioned conference, that Mr. B. had preferred making his complaints known to the editors of several contemporary periodicals, and having failed in inducing any respectable Journal to commence a paper war against us, at length, met with an individual, who from motives merely of personal envy, took upon himself to castigate us, hoping by our degradation to swell his own little importance, and like the *monkey* in the fable, employing Mr. Barton as the *cat's paw.*

The article alluded to, in which our *ignorance*, *stupidity*, *malevolence*, *grossness*, *arrogance*, *baseness*, *illiberality*,

---

* We are requested to state that the above Mr. John Barton, is not Mr. John Barton, the eminent Engineer of the Royal Mint; this awkward coincidence of names and professions, is no doubt extremely unpleasant to the latter gentleman.

misrepresentations, *omissions*, and a few more qualifications are so ably displayed, occupies seven closely printed pages, with occasional luminous remarks, by way of notes, in small letter. We should have been induced to have solicited our reader's indulgence, in quoting literally this uniqe specimen of vulgar abuse, had not the length to which it is spun out, precluded its insertion in our Journal; but as the work alluded to is probably unknown to the greater part of our readers, we shall proceed to notice the complaints of the *nominal* writer, and not presume to insult our readers, by occupying the pages of the Journal of Arts, with any peevish irrelevant wrangling; but shall consign the editor of the work in question, to the *second page of the Wrapper*.

Mr. Barton's letter commences by complimenting the editor, upon his able exposé of our ignorance relative to the welding, or as he calls it, soldering the edges of thin plate iron, (see vol. V. page 311, and also Mr. Willoughby's letter in our present number,) and proceeds to comment upon the *serious causes of complaint*, which patentees in general, have to make against us, for not publishing every word of their specifications literally. We need scarcely mention the mischief which would accrue from exposing all the errors and weak points which are to be met with in the Specifications of valuable inventions, our plan is to give the *substance*.

"In my own case, (says Mr. Barton,) I have to complain, that, in the publication of my Patent for "*Improvements in Propelling, and in the Construction of Engines and Boilers applicable to Propelling, and other purposes*," he has only published *three* of the *ten* drawings in the specification; and those in such an imperfect manner, that they by no means convey an idea of the nature of the improvements. Nor is this all; for, in addi-

tion to these misrepresentations, he has given his own opinion respecting them; his qualifications for which you will be better able to judge of, when I have stated the nature of my complaints.

"In order that you may form an idea of his misrepresentations, I send you my specification; from which you will see that he has merely given the cross-section of my steam-engine boiler, and that in so imperfect a way, that it is quite impossible to construct it according to his shewing; and for want of the side-section, it cannot be understood. He also gives a very bad figure of my lift-pump with a hollow bucket-rod; which I should have been ashamed to bring before the public in such a shape. He has also shewn a section of what he calls 'the chamber of a forcing pump,' but which I term an 'engine for raising water, or other purposes, and well adapted for a fire or blowing-engine:' and here he has entirely mistaken the nature of its construction, *by making the fixed parts moveable, and the moveable part fast!* I cannot, however, make myself well understood, unless by references to figures."

In plate VII. we have copied Mr. B.'s drawings, and given our own also. It must be acknowledged that our drawings in this instance, are not so accurate in detail, as they ought to have been, but when we state that peculiar circumstances prevented us from obtaining copies of these drawings, at the time the patent was reported, and confess that the figures are merely sketches from memory to develope the principle, some allowance should be made, as our plates in general will bear a comparison, both as to accuracy of delineation, and neatness of execution, with the best graphic productions of the day.

We quote the Specificator. "To John Barton, *of Falcon Square, in the City of London, Engineer; for certain Improvements in Propelling, and in the Construction of*

Engines and Boilers applicable to propelling and other Purposes.—Dated May 15, 1820.

"My invention, as it respects boilers, is in their construction of a strong figure; and to make the flue for the fire and smoke, so as to expose a large surface of fire to the fluid, that the heat may have to ascend as much as possible, in every part I can, to act against a part of the boiler where there is water adjoining; and of such a shape that they may work without any surrounding brick-work, if desired; as shewn in Fig. 1, (Plate VII.) end view; and Fig. 2, a side-section. *a a*, shews the fire-place; *b b*, shews the form and situation of the flue, which goes from the fire-place *a a*, and then ascends to the cross-flue *b* 1, from which it returns, towards the fire-place, *b* 2; when it returns round the pipe *c*, which is full of water, and divides the flue; whence it goes towards the chimney or pipe, *b* 3, where the smoke goes away.

"Fig. 3 is a side section of part of a pump or engine, with a hollow rod which I claim as my invention: it answers both for the pump-rod and rising-main; for the water ascends in the inside of the rod, connected, at top, by a joint, or any other method, to allow the water to run off.

"Fig. 4 shews a section of a cock in the cylinder-cover of the engine, for feeding it with grease, oil, or any other fluid, without admitting air; or, as at Fig. 5, it may be used for feeding an engine with water, as it answers the purpose of a double-cock: these may be made to revolve by machinery, so as to give the exact supply required; or be made to rise and fall, with a float in the boiler; and may be used for various other purposes. The chamber must be made larger or smaller, according to the use intended or quantity of fluid required.

"Fig. 6 shews the cylinder-lid, and top of the cylinder; with the cock Fig. 4, shewn on a smaller scale.

"Fig. 7 shows the end-section of my engine, for raising water, or other purposes; and is also well adapted for a fire, or a blowing engine, *as it works with little friction; and has a tendency to improve by use*:—it is shewn with the fan or piston (which is metallic) going towards the left; on which side it is forcing the water up; and the upper valve is open on that side: and it forms a vacuum on the other side, shuts the top valve, and opens the bottom valve to the suction; so that these valves act alternately, and raise water both at the raising and depressing of the handles.

"Fig. 8 is a view of the segments of the metallic piston or fan, which are pressed against the diameter and ends of the cylinder, or working-piece of the engine, by the springs.

"Fig. 9 is an end view of my wheel or drum, made hollow as far as the dotted lines, for propelling or other purposes; it must be air-tight, and buoyant; and its advantage is, that it has the tendency of keeping at the proper depth in the water, so that the paddles act with the greatest effect.

"Fig. 10, an end view of ditto."

Our grossly perverted account of this invention, is as follows, reference being had to the three Figures, 11, 12, and 13.

"The improvements proposed in this patent consist of five parts; viz. first, in the construction and form of the boiler of a steam-engine, the situation of the fire, and the arrangement of the flues, by which the greatest possible surface of the boiler is exposed to the action of the fire. Secondly, in forming the rod of a lift-pump hollow, so as to make it the channel up which the water is to flow after it has passed the bucket. Thirdly, in the con-

struction of the chamber and piston of a forcing-pump, as of a fire-engine, garden-engine, &c. Fourthly, in a mode of supplying pistons with oil or other grease by means of a valve in the top of the cylinder. And fifthly, in the construction of paddle wheels for propelling vessels in water.

"The boiler of the steam-engine is proposed to be cylindrical and placed in a horizontal position, a cross section of which is shown at fig. 11. Plate XVII. *a* is the fire placed upon the grating, and *b* is the ash-pit for the reception of cinders and dust; *c*, *c*, are parts of the boiler occupied with water; *d*, *d*, are parts of the flue passing from the fire up through the water; and *e*, is the chimney for the ultimate exit of the smoke. The flame and heated vapour emitted from the fire passes along the flue under the boiler, and near the extremity of the cylinder turns up as represented by the dotted lines; it then enters the right hand flue *d*, passes along it, (being the whole length of the boiler,) and coming round in front of the middle partition (filled with water) proceeds along the left-hand flue, *d*, to the farther end of the boiler, where it escapes through the chimney, *e*, into the open air. By this disposition of the flues, which pass through the boiler and are surrounded with water, the possibility of their burning is prevented, and the greatest surface of the boiler is subjected to the action of the heat.

"Fig. 12. shews a section of the barrel of a lift-pump; *a*, is the bucket with stuffing as usual, fitted to the barrel; *b*, is the bucket-rod, in this case made large and hollow; *c*, is the clack or valve. When the rod and bucket are forced down into the water, the valve *c*, rises, and the water flows through the bucket into the hollow rod. Upon the rod and bucket being raised, the valve *c*, falls,

and the column of water in the hollow rod will be carried up and discharged at top.

"Fig. 13. shews a section of the chamber of a forcing-pump, in which *a*, is what is commonly called the suction-pipe; *b*, *b* 1, *b* 2, is the chamber; *c*, and *d*, are fans acting as pistons; *e*, and *f*, may be supposed to be the levers, or arms, which work the fans. Upon the right-hand lever, *f*, being depressed, as shown in the figure, the valve or clack, *d*, will open, and the water flow through it into the right-hand space of the chamber, *b* 2. Upon the left-hand lever *e*, being depressed, the fans will alter their situation, the clack *d*, will close, and the clack *c*, open, by which the water will flow through *c*, into the left-hand part of the chamber *b* 1, at the same time the water, which occupied the right-hand side of the chamber *b* 2, will, by the fan *d*, be forced out through the clack or valve *h*, then open, and pass into the breeches-pipe *i*, *i*. Another stroke of the pump (that is by again depressing the lever *f*,) will bring the fans *c*, and *d*, as seen in the figure, and force out the water from the chamber *b* 1, through the clack *g*, into the breeches-pipe *i*, *i*. Thus the water accumulating in the breeches-pipe becomes forced up into the air-vessel *j*, in which the elasticity of the air acting upon the water, ejects it with considerable force through the exit-pipe *k*, and thus the apparatus may be used as an engine for extinguishing fire, &c.

"The method of supplying a piston with oil or grease, is by forming a groove or channel in the top of the cylinder, and filling this channel with the oily matter, which is admitted into the cylinder, by occasionally opening a cock placed in this groove, the handle of which may be connected to a rod or some other contriv-

ance, and the cock be opened by the action of the piston-rod.

"The improved paddle-wheel is made as a hollow drum, having the float-boards placed as tangents to the periphery of the wheel, with curved edges, and the wheel itself buoyant, so as to accommodate itself to the surface of the water." Thus ends our description of these inventions.

Fig. 14 is a section of an engine for raising water, upon exactly the same principle as that of Mr. Barton; this is taken from one erected about twenty-five years ago by the late Mr. Bramah, at Norwich water-works; and a modification of the same principle has been subsequently introduced by the late Mr. Roundtree, still more like that one claimed by the patentee above. This, we presume, is enough to shew what portion of inventive genius belongs to the present patentee.

Now, as to publishing all the drawings given in illustration of certain inventions, and the whole of the tedious descriptions which some patentees think proper to inroll as their specification, we have only to observe, that twenty volumes annually would scarcely contain them; besides, if the essence of the matter can be told in a few words, the reader is certainly better pleased, and generally better informed. In the case before us, we really conceive, and submit it to our readers, that the subject matter of Mr. Barton's inventions are given by us in terms quite as intelligible and explicit as in Mr. B.'s specification. With respect to the boiler, who, that is acquainted with a high pressure engine, does not know that the fire-place is generally in the interior of the boiler, surrounded with water, that the partitions are riveted to the sides, and that the flues pass and repass in every direction, according to circumstances, at the fancy of the maker. We, therefore, are unable to discover the slightest feature of novelty in

this particular boiler, and are prepared to bring twenty of the first engineers in the country to support this opinion. Our sketch, therefore, though not an exact copy, is sufficiently near to shew the plan, and no one could possibly mistake it. With respect to the lift-pump, a slight variation in the curve does not affect the principle; and as to the forcing-pump, or engine for raising water, let any one read the description given in the specification, without any letters of reference to explain the parts, and we question, even with the additional light now thrown upon it, if its operation will be understood. There are several other parts which to us appear equally obscure: for instance, the improvements in propelling, the manner of applying the buoyant paddle-wheel, which is merely mentioned, and not a word about any mode of connection between it and the engine.

Seeing these difficulties upon the first inspection of the specification, a note was addressed to the inventor in these words: —

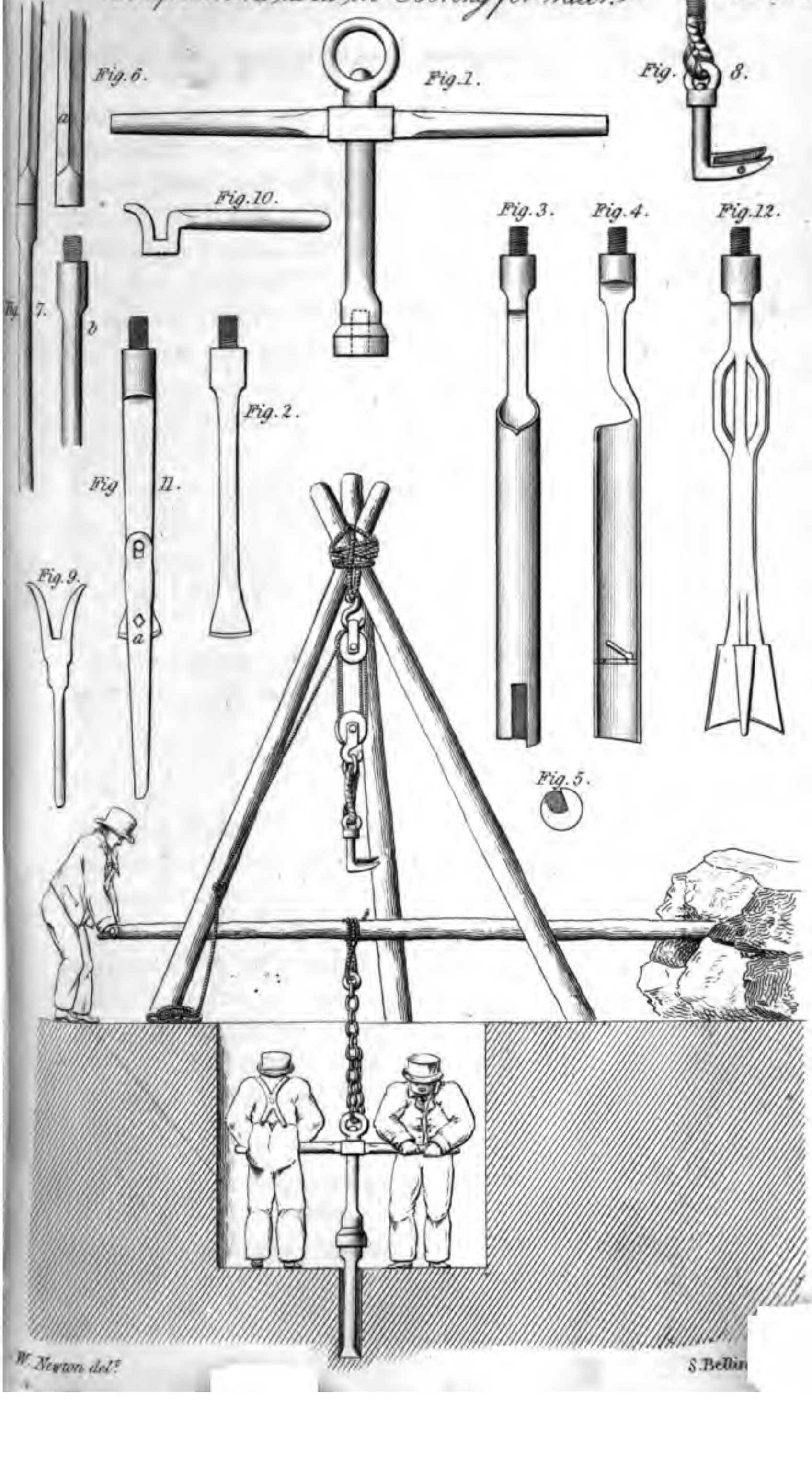
"Sir,

"As conductor of the London Journal of Arts and Sciences, it is my business to give an explanatory account of *every new patent invention;* and as the publication of the specification at large is generally inconvenient, and frequently injurious to the patentee, I shall feel happy in availing myself of your opinions and suggestions as to the manner and extent to which your recently-obtained patent may be best laid before the public in our Journal.

"I am, Sir, yours, &c."

After neglecting to make any reply to this note, most persons would have considered that a portion of the blame rested with themselves, and we question much if any other two individuals, besides Mr. Barton and his sapient editor,

Implements used in Boring for Water. PLATE VII



W. Newton del.t S. Bellin

would have been readily found so totally destitute of every thing like gentlemanly conduct as to publish such a letter, with the comments upon it, as that which bears their joint names.

In conclusion, we beg to apologize to our readers for this tedious but necessary defence, and again to repeat those "*malevolent* observations," as our reviewer thinks proper to call them, which closed our former report: viz. that "the respective advantages of these inventions are not pointed out in the specification, and we are not sufficiently aware of their superiority to inform our readers upon that subject. As to the originality of the plans, we cannot but consider them slight, very slight, variations from other inventions which have long been before the public."

Novel Inventions.

Boring the Earth for Water.

The practice of boring for water, is a subject of such great importance in itself, and of such repeated enquiry among our readers, that we have devoted more than ordinary exertions to fulfil our pledge, and to procure such information relative to that process, as we trust will be found fully satisfactory and explicit. In the neighbourhood of Leeds and Bradford, there are at the present time, several of these operations going on, the manner of conducting which, and the implements employed, we will endeavour to describe.

The situation of the intended well being determined on, a circular hole is generally dug in the ground, about six or eight feet deep, and five or six feet wide. In the centre of this hole, the boring is carried on by two workmen, assisted by a labourer above, as shewn in Plate VIII.

The handle, fig. 1, having a female screw in the bottom of its iron shank, a wooden bar or rail passing through the socket of the shank, and a ring at top, is the general agent, to which all the boring implements are to be attached. A chisel, fig. 2, is first employed, and connected to this handle by its screw at top. If the ground is tolerably soft, the weight of the two workmen bearing, upon the cross-bar and occasionally forcing it round, will soon cause the chisel to penetrate; but if the ground is hard or strong, the workmen strike the chisel down with repeated blows, so as to peck their way, often changing their situation by walking round, which breaks the stones, or other hard substances, that may happen to obstruct its progress.

The labour is very considerably reduced, by means of an elastic wooden pole, placed horizontally over the well, from which a chain is brought down, and attached to the ring of the handle. This pole is usually made fast at one end as a fulcrum, by being set into a heap of heavy loose stones; at the other end the labourer gives it a slight up and down vibrating motion, corresponding to the beating motion of the workmen below, by which means the elasticity of the pole in rising, lifts the handle and pecker, and thereby very considerably diminishes the labour of the workmen.

When the hole has been thus opened by a chisel, as far as its length would permit, the chisel is withdrawn, and a sort of cylindrical auger, fig. 3, attached to the handle,

fig. 1, for the purpose of drawing up the dirt or broken stones, which have been disturbed by the chisel. A section of this auger is shown in fig. 4, by which the internal valve will be seen. The auger being introduced into the hole, and turned round by the workmen; the dirt or broken stones will pass through the aperture at bottom, (shewn at fig. 5,) and fill the cylinder, which is then drawn up, and discharged at the top of the auger, the valve preventing its escape at bottom.

In order to penetrate deeper into the ground, an iron rod, as *a*, fig. 6, is now to be attached to the chisel, fig. 2, by screwing on to its upper end, and the rod is also fastened to the handle, fig. 1, by screwing into its socket. The chisel having thus become lengthened, by the addition of the rod, it is again introduced into the hole, and the operation of pecking or forcing it down, is carried on by the workmen as before. When the ground has been thus perforated, as far as the chisel and its rod will reach, they must be withdrawn, in order again to introduce the auger, fig. 3, to collect and bring up the rubbish, which is done by attaching it to the iron rod, in place of the chisel. Thus as the hole becomes deepened, other lengths of iron rods are added, by connecting them together as *a b*, fig. 7. The necessity of frequently withdrawing the rods from the hole, in order to collect the mud, stones, or rubbish, and the great friction produced by the rubbing of the tools against its sides, as well as the lengths of rods augmenting in the progress of the operation, sometimes to the extent of several hundred feet, render it extremely inconvenient, if not impossible to raise them by hand. A tripedal standard is therefore generally constructed, by three scaffolding poles tied together, over the hole, as shewn in the Plate, from the centre of which a wheel and axle, or

a pair of pully blocks is suspended, for the purpose of hauling up the rods, and from which hangs the fork, fig. 8. This fork is to be brought down under the shoulder, near the top of each rod, and made fast to it by passing a pin through two little holes in the claws. The rods are thus drawn up, about seven feet at a time, which is the usual distance between each joint, and at every haul a fork, fig. 9, is laid horizontally over the hole, with the shoulders of the lower rod resting between its claws, by which means the rods are prevented from sinking down into the hole again, while the upper length is unscrewed and removed. In attaching and detaching these lengths of rod, a wrench, fig. 10, is employed, by which they are turned round, and the screws forced up to their firm bearing.

The boring is sometimes performed for the first sixty or a hundred feet, by a chisel of two and a half inches wide, and cleared out by a gouge of two and a quarter diameter, and then the hole is widened by a tool, such as shewn at fig. 11. This is merely a chisel, as fig. 2, four inches wide, but with a guide *a*, put on at its lower part, for the purpose of keeping it in a perpendicular direction; the lower part is not intended to peck, but to pass down the hole previously made, while the sides of the chisel operate in enlarging the hole to four inches. The process, however, is generally performed at one operation, by a chisel of four inches wide, as fig. 2, and a gouge of three inches and three quarters, as fig. 3.

It is obvious, that placing and displacing the lengths of rod, which is done every time that the auger is required to be introduced or withdrawn, must of itself be extremely troublesome, independent of the labour of boring, but yet the operation proceeds when no unpropitious circumstances attend it, with a facility almost incredible. Some-

times, however, rocks intercept the way, which require great labour to penetrate, but this is always effected by pecking, which slowly pulverises the stone. The most unpleasant circumstance attendant upon this business, is the occasional breaking of a rod into the hole, which sometimes creates a delay of many days, and an incalculable labour in drawing up the lower portion.

When the water is obtained in such quantities and of such quality as may be required, the hole is dressed or finished by passing down it the diamond chisel, fig. 12; this is to make the sides smooth previous to putting in the pipe. This chisel is attached to rods and to the handle, as before described, and in its descent the workmen continually walk round, by which the hole is made smooth and cylindrical. In the progress of the boring, frequent veins of water are passed through, but as these are small streams, and perhaps impregnated with mineral substances, the operation is carried on until an aperture is made into a main spring, which will flow up to the surface of the earth. This must, of course, depend upon the level of its source, which, if in a neighbouring hill, will frequently cause the water to rise up and produce a continued fountain. But if the altitude of the distant spring happens to be below the level of the surface of the ground where the boring is effected, it sometimes happens that a well of considerable capacity is obliged to be dug down to that level, in order to form a reservoir, into which the water may flow, and from whence it must be raised by a pump; while, in the former instance, a continued fountain may be obtained. Hence, it will always be a matter of doubt, in level countries, whether water can be procured which would flow near to or over the surface; if this cannot be effected, the process of boring will be of little or no advantage, except as an experiment to ascertain the fact.

In order to keep the strata pure and uncontaminated with mineral springs, the hole is cased for a considerable depth with a metallic pipe, about a quarter of an inch smaller than the bore. This is generally made of tin, (though sometimes of copper or lead) in convenient lengths; and as each length is let down, it is held by a shoulder resting in a fork, while another length is soldered to it; by which means a continued pipe is carried through the bore as far as may be found necessary, to exclude land-springs, and to prevent loose earth or sand from falling in and choking the aperture.

In Vol. IV. of The London Journal of Arts, p. 201, we have given a concise account of this process of boring for water, which being then obtained under circumstances of difficulty and acknowledged to be defective, must, of course, give place to this more particular, and as we conceive, accurate detail. We have personally witnessed the operation, at several places in the north of England, and have taken the utmost care in describing the process, as we invariably saw it performed, and have given drawings of the implements employed. We perceive, however, that Mr. Good, of Tottenham, whose successful operations in this business we have before noticed, has obtained a patent for some improvements in the process; we shall, therefore, have some further remarks to make upon the subject when the specification of his patent comes under our consideration.

Decomposition of Coal Tar.

We have great satisfaction in stating that a process has at length been discovered, by which coal tar is easily and effec-

tually decomposed, and converted into inflamable gas. It has long been known that gas of a superior quality, may be produced from coal tar, but owing to the carbonaceous residuum attaching itself to the tubes during the process of distillation, they soon became clogged up, and thereby prevented the advantageous employment of the material.

Messrs. Vere and Crane, of Stratford, Essex, have, after repeated experiments, succeeded in constructing an apparatus, by which *seventy-five cubic feet of pure gas*, can be driven off from *every gallon of tar*. The apparatus is simple, and not likely to be out of repair. The tar is admitted by drops, into a hot chamber, from whence a tarey vapour arises, which proceeds to a red hot retort. At the time of the vapour making its exit from this retort a small jet of steam acts upon it, and precipitates the remaining carbonaceous matter, which it held, leaving the volatile part a pure carburetted hydrogen gas, perfectly fit for the purposes of illumination. Thus a material hitherto almost useless has, by the discovery of these gentlemen, become a valuable commodity, and every gallon of which, (valued at present only at one penny,) is rendered capable of supplying an ordinary argand burner for the space of twenty-four hours at least, and of producing a very superior light. A patent having been obtained for this invention we shall more particularly explain the process, when the specification is Inrolled.

Breaking Stones by Steam.

A machine has been invented for the purpose of applying the power of steam to the breaking of stones for the construction of roads on Mr. M'Adam's system. It con-

sists of two fluted rollers, placed side by side, about an inch apart, and turning different ways. The stones are put into a kind of hopper above, and pushed down with a rake, which afford a regular supply to the roller. It is worked by one of Kay and Routledge's rotatory engines, of one-horse-power, and will completely break a ton of hard pebbles in about six or eight minutes.

Novel Ferry Boat.

A singular ferry-boat has been established at Troy, on the Hudson River, North America, 166 miles from its mouth, the river being nine hundred feet broad. A boat is entirely covered by a platform or floor, on which is placed a massive wheel, in an oblique position, occupying the whole breadth of the boat. This wheel is turned by the hoofs of two horses, and communicates its motion, by means of teeth, to two vertical wheels attached to the sides of the vessel, which is thus propelled in a manner precisely similar to the steam-boat.

Polytechnic and Scientific Intelligence.

Society of Arts.

List of Premiums for the Session 1823—1824, *continued.*

Agriculture.—*The gold medal* for having planted the greatest number of acres (not less than fifty) of land, un-

fit for tillage, with the best sorts of forest trees, for timber, between October 1st, 1819, and April 1st, 1820. *The silver medal* for the next greatest quantity, not less than thirty acres.

The gold medal, for having set, in 1817-18, the greatest quantity of land (not less than fifteen acres) with acorns, and for effectually preserving the same, to raise timber. The *silver medal* for the second greatest quantity, not less than ten acres.

The gold medal for having planted, between June, 1820, and June, 1821, the greatest number of larch trees, not fewer than fifty thousand. The *silver medal* for the next greatest number, not fewer than thirty thousand.

The gold medal for the greatest number (not less than two thousand) of fir seedlings imported from Norway and planted during 1821. The seedlings should be of three or four years' growth, and planted in a moderately good soil, somewhat sheltered. The wood from the district of Christiana is the best for carpenters' and joiners' use, and from Long Sound for spars and refers.

The gold medal for ascertaining the comparative merits of raising oaks from acorns set on land properly dug or tilled; from acorns set by the spade or dibble without tillage; and from young plants raised in nurseries and transplanted.

The gold medal for the best set of experiments made on not less than twelve acres, four acres being sown broadcast, four drilled, and four dibbled, to ascertain the best mode of cultivating wheat.

The silver medal for raising the greatest quantity of grass seeds. The same for cultivating the greatest quantity of land, not less than five acres, with parsnips, for feeding cattle and sheep

The gold medal for the best method of destroying the fly on hops. The same for destroying the fly on turnips, or preventing its injurious effect on the crop.

The same for the best method of preventing the blight, or ravages of insects, on fruit trees and culinary plants.

The gold medal, or fifty guineas, for the best method of curing the rot in sheep. *The silver medal or ten guineas,* for the best mode of protecting sheep from injury by flies.

The gold medal, or fifty guineas, for the best method of raising water in quantities sufficient to be beneficially employed in irrigating land. A model on the scale of one inch to a foot must be produced.

The silver medal, or twenty guineas, for a machine or plough for paring land preparatory to burning, to be worked by not more than one man and two horses. At least ten acres must have been pared by it.

The silver medal, or fifteen guineas, for the best machine for dibbling wheat. Three acres must have been dibbled by it.

The gold medal for a machine by which corn may be thrashed better than by any method now in use, and with as little injury to the straw as from thrashing by the flail. At least thirty quarters must have been thrashed by it.

CHEMISTRY, DYING, AND MINERALOGY.—*The gold medal* for a test for arsenic in solution, superior to any hitherto known.

The gold medal, or fifty guineas, for making the greatest quantity of bar iron, not less than ten tons, with coke, from coke pigs, equal in quality to the best iron imported from Sweden or Russia, and as fit for being converted into steel.

The gold medal, or fifty guineas, for preparing the

largest quantity of sulphuric acid, from sulphur, without the use of any nitric salt, and of a specific gravity not inferior to the best sulphuric acid of commerce.

The gold medal, or thirty guineas, for the best composition for copper-plate printers' ink, fit for the finest kind of copper-plate printing.

The silver medal, or fifteen guineas, for the best method of rendering leather water-proof, without injuring its flexibility.

The gold medal, or thirty guineas, for the best method of preserving salted provisions from becoming rancid or rusty.

The gold medal, or thirty guineas, for the best method of preventing the destructive effects occasioned by moths and other insects in furs, woollens, and other articles.

The gold medal, or fifty guineas, for the best substitute for the lead pipes used for conveying liquors from the cellars to the bars of public-houses.

The gold medal, or fifty guineas, to the author who shall publish the natural history of any county in the United Kingdom.

Polite Arts.—To gentlemen under the age of twenty-five, sons or grandsons of peers or peeresses, for the best original painting or drawing of a portrait, landscape, flowers, or fruit, or still life, the *gold Isis medal;* for the next in merit, *the silver medal.* The *silver medal* and *silver Isis medal,* for the best and second best copies of the foregoing. To ladies under twenty-five, daughters or grand-daughters of peers or peeresses, the same.

To gentlemen and ladies under the age of eighteen, for the best drawing in chalk, pencil, or Indian ink, being a copy from any picture, print, or drawing of a head or figure, the *silver Isis medal.* For the next in merit, the *silver palette.*

To gentlemen under the age of eighteen, *the silver Isis medal*, for the best copy, in chalk, pencil, or Indian ink, from any picture, print, or drawing of a head or figure; *the silver palette* for the next in merit. To ladies under eighteen, the same.

To gentlemen under twenty, *the silver medal*, for the best drawing from a bust; *the silver Isis medal* for the next best. To ladies, the same.

The gold Isis medal for the best free etching in historical composition, from a picture of eminence, by persons under twenty-five; *the silver medal* for the next best. *The silver medal* and *silver Isis medal* for the two best etchings of a landscape.

To persons under thirty, for the best finished engraving, in historical composition, *the gold medal*; for the next in merit, *the gold Isis medal.*

For the best finished engraving of a landscape, and for the same of a portrait, *the gold Isis medal*; *the silver medal* for the next in merit of each. *The silver medal* for the same of a portrait in mezzotinto.

For the best specimen in lithography, *the silver medal.* The same, or *twenty guineas*, for the best mode of transferring drawings from the paper to the stone, for the purpose of lithography.

Manufactures.—*The silver medal, or ten guineas*, for determining, by experiments, the best thickness of cotton wicks for candles, so as to obviate the defects of those commonly used.

The silver medal, or twenty guineas, for a method of making paper from the pulp that shall be perfectly transparent, and take and retain common ink with the same facility and correctness as the writing-paper now in use.

The gold medal, or thirty guineas, for a method of

British colony, in the years 1823, 1824, or 1825, and importing, the greatest quantity of silk proper for manufactures, not less than one hundred pounds weight. For the next greatest quantity, not less than fifty pounds, *the silver medal, or twenty guineas.*

The same premiums are specially offered for the colonies of the Cape of Good Hope, the Mauritius, and New South Wales.

The gold medal, or fifty guineas, for growing the greatest quantity of tea, not less than twenty pounds weight, in the Island of Jamaica, or any other British West India colony, and importing the same into Great Britain.

The same premium is offered for the Cape of Good Hope, the Mauritius, and New South Wales.

The gold medal for the best and most authentic account, from information obtained in China, of the culture of the plant, the leaves of which furnish the tea; together with the mode of gathering and otherwise preparing the leaves. This premium is extended to 1825 and 1826.

(*To be continued.*)

Linnæan Society.

June 3d. This society met, after the celebration of its anniversary in May 24th. The following papers were read:—

Description of a new species of *Erythrina*, called *E poianthes*, by Felix d'Avellar Brotero, Professor of Botany at Coimbra, F. M. L. S. a curious plant, cultivated principally in the Royal Botanic Garden near Lisbon. Its native country is unknown, but probably it is America.

A letter was read from the Rev. Mr. Whitear, of Har-

leston, Norfolk, stating that the Little Bustard, *(Otis tebrax)* a native of warm climates, and stated never to be found in the North, had been killed at Butley, near Orford, Suffolk, and is now in the possession of a Mr. Seaman, of Ipswich.

An extract of a letter to W. G. Maton, Esq. V. P. L. S. from the Rev. S. L. Jacob, stating that a flying-fish *(Exocœtus volans)* was caught in July, in the Bristol Channel, near Bridgewater. And a letter from Mr. R. Anstis, relative to a bird shot near the same place, almost similar to the crested cormorant, but distinguished by having sixteen feathers in its tail.

June 17th. Major-General Hardwicke, F. L. S. read two papers, descriptive of *Antilope Quadricornis*, the *Chikara* of Bengal. This animal inhabits the forest and mountainous tracts of the western parts of Bengal, Bahar, and Orissa. Its height is about twenty inches; length, exclusive of the tail, thirty-three inches; length of the tail, five inches; greatest circumference of the body, twenty-nine inches. It has two sets of horns, one set on the forehead, about five inches in length, and another, something less, between the eyes. The upper parts of the body are of a bright bay colour; the under parts white, with a few yellow hairs. The female has no horns, and is less bright in colour. General Hardwicke's other paper was a description of *Buceros Hornbill*, without the helmet or rostral appendage, with a pendant gular sac, or pouch. This bird is a native of the woods about Chittagong and Sylhet, and resembles the *Calao Javar* of Le Vaillant, as described by Shaw.

The reading of Dr. Hamilton's Commentary on the second part of the *Hortus Malabaricus* was resumed; after which the Society adjourned to November 4th.

Geological Society.

May 16. A letter was read on the matrix of the diamond, from Henry Henland, Esq. Foreign Secretary, G. S. addressed to Dr. Babington, P. G. S. Two specimens were produced and described; one from Abbaete, in Brazil, was a mixture of oxide of iron with small water-worn quartz pebbles, containing a diamond. This is called *Cascalhao*, and is believed by Mr. Henland to be of alluvial origin. The other specimen, from Pereira in Brazil, was a very small brilliant dodecahedral diamond, surrounded by skorodite, or cupreous arseniate of iron, in a gauge or matrix of massive oxide of iron, (Werner's brown ironstone.) This oxide according to the best authorities, forms veins or strata, twenty-five feet deep, resting on chlorite schist, in the mountains near Pereira. The paper concluded, by expressing an opinion that it is the true matrix, at least of the Brazilian diamond, which appears confirmed by the locality where diamonds have not before been discovered; by its being accompanied by the arseniate of copper; and by the difference of this oxide of iron, from that in the *Cascalhao*, which is either earthy, granular, or in water-worn particles.

June 6th.—A paper was read by Charles Lyell, Esq. Sec. G. S., containing remarks on sections presented by the rivers Isla, Melgum, Proson, and S. Esk, in the county of Forfar; with some general observations on the geology of that county, accompanied with specimens.

June 20th.—The following papers were read:

A notice on some Fossil Bones of an Icthyosaurus from the Lias, near Bristol: also on two new species of Fossil Teeth. By George Cumberland, Esq. Hon. M. G. S.

giving an account of some Magnetic Observations, made by him at Sea, and at the Isle of St. Catherine.

M. de la Borne presented a memoir, entitled, A Thermal Electrometor, and formulæ representing its effects.

Society of Arts, Edinburgh.

The following subjects, are proposed for honorary and pecuniary rewards, to be presented during the season, 1823-4,—the competition being open to the natives of all countries.

IN MECHANICS.

For the most important invention,—*The Keith Gold Medal.*

For the best set of experiments connected with the practical arts.—*The Keith Silver Medal.*

For the best set of experiments on an hydraulic apparatus, called Barker's mill.—*An Honorary Medal.*

For the most important invention, introduced from Abroad.—*Ditto.*

For the best invention in agricultural apparatus.—*Ditto.*

For the best paper on selecting, working, and hardening steel.—*Ditto.*

For the most accurate and economical screw tool.—*Ditto.*

For a cheap mode of producing printing diagrams and plans.—*Ditto.*

For improvements in time-keepers, by artists resident in Scotland.—*Ditto.*

For correcting the secondary colours in reflecting telescopes.—*Ditto.*

The improvements in carts.—*Ditto.*

For water-wheels capable of adjusting themselves to the tide.—*Ditto.*

IN CHEMISTRY.

For the most important discovery, during the season, 1823-4.—*Honorary Medal.*

For the best experiments on the treatment of Foreign wines.—*Ditto.*

For the best mode of preserving meat.- *Ditto.*

For the best essay on the chemical action of manures.—*Ditto.*

IN GENERAL SCIENCE.

For the best and cheapest apparatus for producing oil gas for private houses.—*Honorary Medal.*

For the best mode of heating and ventilating ordinary dwellings.—*Ditto.*

For the best specimens of substances, (prepared in Scotland,) for the construction of economical roofs.—*Ditto.*

For the 1st. 2nd. and 3rd. best specimens of lithographic printing, in Scotland.—*Ditto.*

New Patents Sealed, 1823.

To William Harwood Horrocks, of Portwood within Prinnington, in the county of Chester, cotton manufacturer, for his invention of a certain new and improved method applicable to preparing, cleaning, dressing, and beaming silk-warps, and also applicable to beaming other warps.—Sealed, July 24th.—Six months for Inrolment.

To Richard Gill, of Barrowdown, in the county of Rutland, fellmonger and parchment manufacturer, for his new method of preparing, dressing, and dying sheep-skins and lamb-skins with the wool on, for rugs for carriages, rooms, and other purposes.—Sealed, July 24th.—Two months for Inrolment.

To William Jeakes, of Great Russell-street, in the parish of St. George, Bloomsbury, in the county of Middlesex, for his invention of an apparatus, for regulating the supply of water, in steam boilers, and other vessels, for containing water, or other liquids.—Sealed, July 24th.—Six months for Inrolment.

To William Davis, of Bourne, in the county of Gloucester, and of Leeds, in the county of York, engineer, for his invention of certain improvements in machinery, for shearing and dressing woollen, and other cloths, requiring such process.—Sealed, July 24th.—Six months for Inrolment.

To Henry Smart, of Berners-street, in the parish of St. Mary-le-bone, in the county of Middlesex, piano-forte manufacturer, for his invention of certain improvements in the construction of piano-fortes.—Sealed, July 24th.—Six months for Inrolment.

To Miles Turner, and Lawrence Angell, both of Whitehaven, in the county of Cumberland, soap-boilers, for their invention of an improved process to be used in the bleaching of linen, or cotton yarn, or cloth.—Sealed, July 24th.—Two months for Inrolment.

To John Jackson, of the town of Nottingham, gun-maker, for his invention of certain improvements in the construction of locks, used for the discharge of guns, and other fire arms, upon the detonating principle.—Sealed, July 29th.

To Joseph Bower, of Hunslet, in the parish of Leeds, in the county of York, oil of vitriol manufacturer, and John Bland, of Hunslet, aforesaid, steam-engine manufacturer, for their invention of certain improvements in such steam-engines as condense out of the cylinder, by which improvement or invention, the air pump is rendered unnecessary. —Sealed, July 31st.—Two months for Inrolment.

To John Bainbridge, of Bread-street, Cheapside, in the City of London, Merchant, (in consequence of a communication received by him, from a foreigner resident in the United States of North America, Merchant,) for certain improvements upon machines for cutting, cropping, or shearing wool, or fur from skins, also for cropping, or shearing, woollen, silk, or other cloths, and velvets, or any other fabric, or fabrics thereof respectively, whether made or

composed entirely of wool, silk, cotton, or other materials, of which cloth or velvet is made, or of any mixture or mixtures thereof respectively, and also for the purpose of shaving pelts or skins.—Sealed, July 31st.—Six months for Inrolment.

To Louis John Pouchee, of King-street, Covent-garden, in the county of Middlesex, type-founder, in consequence of a communication made to him by a certain foreigner residing abroad for certain machinery or apparatus to be employed in the casting of metal types.—Sealed, August 5th.—Six months for Inrolment.

To Robert Dickinson, of Park-street, Southwark, in the county of Surrey, Esq. for his invention of an improvement in addition to the shoeing, or stopping, and treatment of horses' feet.—Sealed, August 5th.—Six months for Inrolment.

To James Barron, of Wells-street, in the parish of St. Mary-le-bone, venetian-blind manufacturer, and Jacob Wilson, of Welbeck-street, in the parish of St. Mary-le-bone, upholsterer, in the county of Middlesex, for their, invention of certain improvements in the construction and manufacturing of window blinds.—Sealed, August 11th—Six months for Inrolment.

To William Wigston, of Derby, in the county of Derby, engineer, for his invention of a certain improvements on steam-engines.—Sealed, August 11th.—Six months for Inrolment.

To Henry Constantine Jennings, of Devonshire-street, in the parish of St. Mary-le-bone, in the county of Middlesex, Esq. for his invention of an instrument, or machine, for preventing the improper escape of gas, and the danger and nuisance consequent thereon.—Sealed, August 14th.—Six months for Inrolment.

To Robert Rogers, late of New Hampshire, in the United States, of America, but now of Liverpool, in the county of

Lancaster, master mariner, and ship owner, for his invention of improved landyard, for the shrouds, and other rigging of ships, and other vessels, and an apparatus for setting up the same.—Sealed, August 18.—Two months for Inrolment.

To John Malam, of Wakefield, in the county of York, engineer, for his invention of a new mode of applying certain materials hitherto unused for that purpose, to the constructing of retorts, and improvements in the other parts of gas apparatus.—Sealed, August 18th.—Six months for Inrolment.

To Thomas Leach, late of Friday-street, in the City of London, merchant, but now residing at Litchfield, in the county of Stafford, for his invention of improvement in certain parts of the machinery for roving, spinning and doubling wool, cotton, silk, flax, and all other fibrous substances.—Sealed, August 18th.—Six months for Inrolment.

To Robert Higgin, of the City of Norwich, shawl manufacturer, for his invention and discovery of a new or improved method of consuming or destroying smoke.—Sealed, August 18th.—Six months for Inrolment.

To George Diggles, of College-street, in the parish of St. John, Westminster, in the county of Middlesex, gentleman, for his invention of an improved bit, for riding of horses, and for horses used in single and double harness.—Sealed, August 19th.—Six months for Inrolment.

To Edward Elwell, of Wednesbury Forge, in the county of Stafford, spade, and edge-tool maker, for his invention of certain improvements in the manufacture of spades and shovels.—Sealed, August 20th.—Two months for Inrolment.

To Matthias Archibald Robinson, of Red-lion-street, in the parish of St. George the Martyr, in the county of Middlesex, for his invention of certain improvements in the mode of preparing the vegetable matter, commonly called pearl-barley, and grits, or groats, by which material, when so prepared, a superior mucilaginous beverage may be produced in a few minutes.—Signed, August 20th.—Six months for Inrolment.

To John Goode, of Tottenham, in the county of Middlesex, engineer, for his invention of certain improvements in machinery, tools, or apparatus for boring the earth, for the purpose of obtaining and raising water.—Sealed, August 20th.—Two months for Inrolment.

D.	H.	M.	S.	
1	9	57	0	☾ in conj. with ♂ long. 3s 27° 21′. Dif. dec. 1° 0′ ☾ 20° 40′ N. ♂ 21° 40′ N.
2	0	0	0	☾ in Perigee.
2	15	26	17	♃'s 1st Sat. eclipsed.
3	0	0	0	☿ in his descending node, long. 5s 28° 30′
4	10	18	0	Ecliptic Conjunction ● New Moon
7	0	0	0	♄ stationary. long. 1° 23° 54′.
7	7	16	0	☽ in conj. with ♀ long. 6s 21° 47′. Dif. dec. 28′ ☽ 13° 13′ S. ♀ 13° 41′ S.
7	15	5	6	♃'s 2nd Sat. eclipsed.
10	20	9	0	☽ in conj. with α ♏. long. 8s 7° 12′ Dif. dec. 42′ ☽ 25° 20′ S α ♏ 26° 2′ S.
11	18	42	0	☽ First quarter.
12	12	33	8	♃'s 3rd Sat. will emerge from his shadow.
14	0	0	0	☽ in Apogee.
14	0	0	0	☿ in Aphelion.
16	0	0	0	♅ stat. long. 9s 7° 30′.
18	13	41	45	♃'s 1st Sat. eclipsed.
19	8	34	0	☿ in conj. with α ♏ long. 6s 21° Dif. dec. 3° ☿ 10° 16′ S. α ♏ 10′ 13′ S.
19	13	40	17	♃'s 3rd Sat. eclipsed.
19	16	32	13	♃'s 3rd Sat. will emerge from his shadow.
19	20	55	0	Ecliptic opposition ● Full moon.
20	0	0	0	♀ stat. long. 6s 24° 30′.
23	8	59	0	☉ enters Libra.
24	3	52	0	☾ in conj. with ♄ long. 1s 23° 41′ Dif. dec. 6° 37′ ☾ 22° 59′ N. ♄ 16° 22′ N.
25	0	0	0	☿ at his greatest elongation.
25	15	35	10	♃'st 1st Sat. eclipsed.
27	0	47	0	☾ in quadrature entering the last quarter.
27	10	47	0	☾ in conj. with ♃ long. 3s 9° 30′. Dif. dec. 1° 36′ ☾ 24° 29′ N. ♃ 22° 53′ N.
29	0	0	3	☾ in Perigee.
29	22	36	0	☾ in conj. with ♂ long. 4s 14° 53′. Dif. dec. 2° 56′ ☾ 14° 48′ N. ♂ 17° 44′ N.

N.B. All the above calculations are made to mean or clock time.
The waxing moon ☽—the waning moon ☾.

METEOROLOGICAL JOURNAL, JULY AND AUGUST, 1823.

1823.	Thermo.		Barometer.		Rain in inches.	1823.	Thermo.		Barometer.		Rain in inches.
	Higt.	Low.	+	—			Higt.	Low.	+	—	
JULY.						JULY.					
26	64°	49	+ ,08	. .	,05	10	63°	49°	. .	— ,03	,125
27	68	45	,10	. .	,05	11	73	46	. .	— ,02	,15
28	69	51	. .	— ,04	,075	12	75	57	. .	— ,05	. .
29	65	52	. .	— ,04	,125	13	73	54	+ ,02	— ,12	. .
30	69	50	,03	. .	,025	14	65	55	,20	. .	. .
31	68	53	,11	. .	. .	15	66	54	. .	— ,15	. .
AUG.						16	63	39	. .	— ,01	. .
1	68	43	,02	— ,02	. .	17	69	43	,07	. .	,05
2	65	53	. .	— ,11	. .	18	64	50	. .	— ,08	. .
3	67	58	. .	— ,15	. .	19	70	57	,01	— ,01	. .
4	65	52	,05	. .	,225	20	68	52	,01	— ,01	,05
5	67	50	,04	. .	. .	21	61	44	,01	— ,01	,275
6	66	42	,03	. .	,025	22	64	46	,03	. .	,05
7	62	51	. .	— ,01	. .	23	70	55	,08	. .	,35
8	64	51	. .	— ,03	,125	24	70	56	,05	— ,01	,025
9	56	44	,19	. .	. .	25	78	53	,05	. .	,125

LUNAR RAINBOW.—This unfrequent phenomenon never perhaps presented a more interesting appearance than on the evening of the 20th of August, when the Bow was to be seen perfectly on a very dense himbus in the N. E.

Lower Edmonton. C. H. ADAMS.

LITERARY AND SCIENTIFIC NOTICES.

A translation from the last Paris edition of Berthollet on Dyeing, with Notes, by Andrew Ure, M.D. F.R.S. is expected to appear at the end of the autumn.

The third and last volume of Sismondi's esteemed History of the Literature of the South of Europe is in the press. It comprises the Spanish and Portuguese writers.

Mr. Thomas Taylor is preparing for the press a mathematical work, called the Elements of a New Arithmetical Notation, in some respects analogous to that of decimals.

Mr. Sheldrake has issued proposals for publishing by subscription, an Enquiry into the Origin and Practice of Painting in Oil. It is expected to contain much valuable practical information to artists and men of science.

A work is about to appear on the comparative advantages of different modes of Life Assurance.

The third edition of Sir Astley Cooper's work on Dislocations and Fractures of the Joints is in the press, with an appendix, in refutation of some remarks in a late critical publication.

Mr. J. M. Duncan is about to publish Travels through part of the United States in Canada, in 1818 and 1819.

A most valuable relic of antiquity has recently been discovered at Rome. The first military column, the centre of the Roman Empire, has been found in the course of some researches in the Forum; and further treasures are expected to be brought to light, as there is some intention of clearing away the accumulated ruins and earth which cover this theatre of ancient Roman magnificence.

M. Freytag, of Bonn, is printing an Arab Dictionary. The German J speak highly of its merits.

The birth of Linneus, the gre ralist, was on May 24th comme at Flushing, Long Island, Nortl rica.

Dr. Hibbert has announced entitled Sketches of the Philos Apparitions; or an attempt t such Illusions to their Physical (

Mr. Plumbe has in the press tise on the Diseases of the Ski prising the substance of an Es which the College of Surgeo awarded him the Jacksonian p reprint of his valuable "Essa Ringworm," &c. and copious n the latest improvements in the logy and Treatment of Cutane eases.

The tea plant is said to be c in Brazil, with great success, b tuguese Gentleman, assisted Chinese gardeners.

Hydrogen Gas, for the pu lighting premises, is coming in ral use in Calcutta.

Cotton has recently been cult the South of France, and, we un with every prospect of compl cess.

A new mineral, named *ach* been discovered in the south of It occurs only crystallized, glass, and melts before the b into a black globule; its specifi is 3.24. Another mineral call *walite*, has also been found in It resembles the black garnet of and occurs massive; it is gre greyish black, as hard as gl very brittle.

LONDON:
SHACKELL AND ARROWSMITH, JOHNSON'S-COURT, FLEET-STREET.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. XXXIV.

Recent Patents.

To NATHANIEL PARTRIDGE, *of Bow Bridge, near Stroud, in the County of Gloucester, Dyer, for an Improvement in the setting or fixing of Steam Boilers, or other Coppers, and of communicating Heat to Boilers or Coppers, by which a considerable saving of Fuel will be effected, and the Smoke more effectually consumed.*

[Sealed 14th February, 1823.]

THIS improvement consists in a mode of heating two or more boilers by one furnace, and in a peculiar formation of the flues; the particular object of which is to retain the heat, and cause it to act upon the boilers with increased effect, so as to economise fuel. The plan, by which these objects are obtained, is exhibited in Plate IX.—Fig. 1, is a longitudinal section of the furnace and flues, over which two dyeing pans are erected. Fig. 2 is a horizontal section of the pans and flues taken through at the dotted line A B

in Fig. 1, the respective letters referring to the same parts of the erection in both figures. *a* and *b* are two coppers or boilers employed in dyeing; *c* is the furnace or fire-grate, upon which the fuel is ignited; *d* is the first bridge placed in that situation for the purpose of contracting the flue. Over this bridge the flames pass, and along the flue *e*, to *f*, which is a second bridge, or contraction of the flue. From hence the flame proceeds into the second chambers of the flue *g*, and thence upwards through the aperture *h* into the upper range of flues.

This upper range will be best seen by reference to Fig. 2. The current of flame and heated vapour rising up the aperture *h* becomes here divided, and passes latterally into the chambers *i i*, where its progress is interrupted by the contracted parts of the flues *k k*, which causes the heat to be partially retained in the chambers *i i*. Through these narrow passages *k k*, the heat passes to chambers *l l*, and is again impeded by the contracted parts of the flues *m m*; it thence proceeds through the aperture *n*, to the further chambers *o o*, and *p p*, in which progress it experiences the like partial retention, and ultimately escapes through the chimney *q*.

By this construction and direction of the flues the heat is considered to be more beneficially employed around the boiler than by any other construction of flues heretofore devised; and two or more boilers may be effectually heated upon this plan by one fire, with nearly the same quantity of fuel that would be required to heat one boiler upon any of the old constructions.

If it should be desirable at any time to employ only one of the boilers, as *a*, a valve may be opened between the two boilers at *r*, Fig. 1, by which the heat will ascend and pass through the aperture *n*, Fig. 2, and thence proceed into the chambers *o o*, and *p p*, round the boiler *a*, and there

effect its purpose without communicating any considerable portion of heat to the boiler *b*.

In some cases, it may be thought desirable to carry the flues round the boilers by what is called a wheel draft instead of a divided draft, as described above; under which circumstance the chimney will be at the reverse end to that shewn in the figure. This is considered to be more particularly applicable to the boilers of steam-engines. A door or damper may be opened in the brick-work, as *s*, Fig. 2, for the purpose of admitting cold air, when the temperature of the coppers require to be lowered.

This plan of setting and constructing the flues is considered to be applicable to a great variety of boilers, whether open or closed, as the pans employed by dyers, brewers, soap-makers, and divers other trades, and also to the boilers of steam-engines.

The further improvements proposed for the consumption of smoke consist in the introduction of a sliding door at the mouth of the furnace *t*, Fig. 1, which not only excludes the cold atmospheric air from the furnace during the time that the coal is introducing on to the feed-plate *v*, but also enables the coal there deposited to become baked and converted into coke. This door may be introduced in its place, as shewn, by means of a lever or rack and pinion, contrived to raise it up through an aperture in the bottom of the feed-plate; or it may be slidden latterally in grooves, or worked in various other ways.

In introducing the fuel on to the feed-plate, after the furnace is ignited, it is necessary first to close the slider *t*, by which the admission of cold air is prevented; and when the feed-plate is sufficiently supplied with coal, the outer door *u* must be closed. In order to feed the furnace, a rake is to be introduced, the handle of which must pass through a small hole in the outer door *u*, and when the

slider *t*, is removed, portions of the fuel may be pushed forward on to the fire-grate.

As a portion of smoke and combustible vapours will be given out from the coal, while baking upon the feed-plate, between the doors, *u* and *t*, it will be necessary to permit it to pass over or through an aperture in the door *t*, by which means the smoke and other vapours generated in that chamber will pass through the fire and become perfectly consumed.

The patentee states, that though he has described the particular construction of a furnace erected upon his plan, yet he does not mean to confine himself to the exaet form there represented, as the principle upon which his claim of patent right is founded, consists in forming the flues into chambers or reservoirs for retaining the heat, (the sides of which may be either curved or angular) with contracted passages at the ends of the chambers; and in setting two or more boilers to be heated by one fire; also in the introduction of a door or slider at the furnace mouth, between the outer door and the fire, for the purpose of excluding the cold air, and of more effectually consuming the smoke.

Inrolled August, 1823.

To STEPHEN FAIRBANKS, *of the United States of America, but now residing in Norfolk-Street, Strand, in the County of Middlesex, Merchant, (in consequence of a Communication made to him by a certain Foreigner residing abroad) for an Invention of certain Improvements in the Construction of Locks and other Fastenings.*

[Sealed 10th July, 1823.]

THESE improvements consist in the employment of a helical spring, commonly called a spiral or worm spring, for

the purpose of forcing out the bolt or latch of a lock, instead of the ordinary feather springs, or Scotch springs which are used in locks and latches of the usual construction. These helical springs may be employed in locks of a variety of kinds, and they may be connected to the locks in several ways, so as to project the bolts or latches either by pulling or pushing them.

The manner of applying these helical springs to locks and latches of the ordinary construction, will be seen in Plate X. fig. 6. which is a rim lock, (the face plate being removed,) with two helical springs adapted in place of the feather or Scotch springs above mentioned; *a* is the bolt; *b* the tumbler; *c* the helical spring acting against the tail of the tumbler; *d* is a small tooth extending from the side of the tumbler, which falls into one of the notches on the upper side of the bolt; *e* is a stud, forming the pivot on which the tumbler moves, its lower part being made square, for the purpose of guiding the bolt as it slides in and out; *f* is the bridge and wards, and a small stud, *g*, supports the bottom of the helical spring. The key, on being introduced at the key-hole, is turned round as usual, when its periphery raises the tumbler, and by releasing the tooth *d*, from the notch, allows the bolt to be slidden out. When the periphery of the key has passed the tumbler, the pressure of the helical spring acting against its tail, causes the tooth to fall into the second notch, by which the bolt is held fast until the tumbler is again raised by the key, and the bolt sliden back.

A sliding latch, or catch bolt, *h*, may be pressed out by a similar helical spring, *i*, which may be placed in the fork, as shewn, or in any other sort of recess; *k* is called the follow, with its two wings acting against the tails of the bolt; a pair of knobs, with a spindle, as usual turns the follow,

and draws back the bolt, which is again projected forward by the helical spring.

This kind of spring is applicable to various sorts of locks, which it is perfectly unnecessary to represent, as the invention consists simply in the introduction of the helical spring instead of the feather or Scotch spring, as above said. It is therefore claimed in its adaptation to every kind of locks to which it may be applicable; the peculiar advantages of which are, that the bolts or latches are moved with greater ease than by any other sort of springs, and also that the helical springs, whether constructed to exert their force by expansion or contraction, are more durable, and less likely to get out of order, than any other description of springs hitherto applied to locks or latches.

[*Inrolled September*, 1823.]

To William Goodman *of the City of Coventry and the Borough of Warwick, Hatter, for certain Improvements on Looms.*

[Sealed 27th September, 1822.]

These improvements apply to that description of looms usually employed for the weaving of narrow articles, such as tapes and ribbons, (commonly called Dutch engine looms) and consist principally in a novel arrangement of the shuttles and slays in the batten. The general appearance of the loom, with its improvements, will be seen in Plate X. Fig. 3, which is an end view of the loom, shewing the disposition of the warps for two sets of shuttles. Fig. 4, shews a part

Goodmans Improved Loom. **PLATE IX.**

Fig. 3.

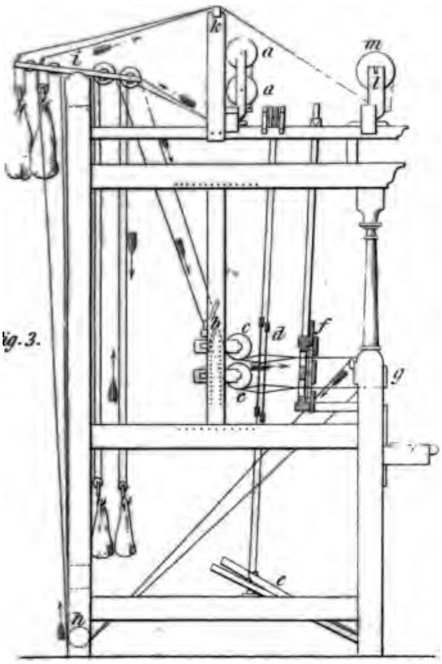


Fig. 4.

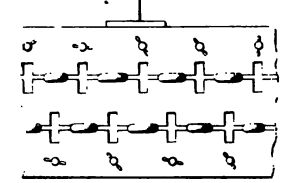
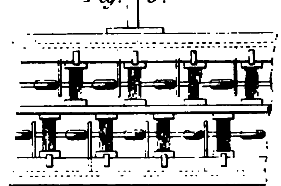
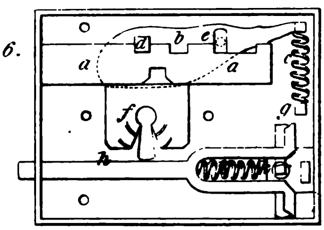


Fig. 5.



Fairbanks's Imp.d Lock.

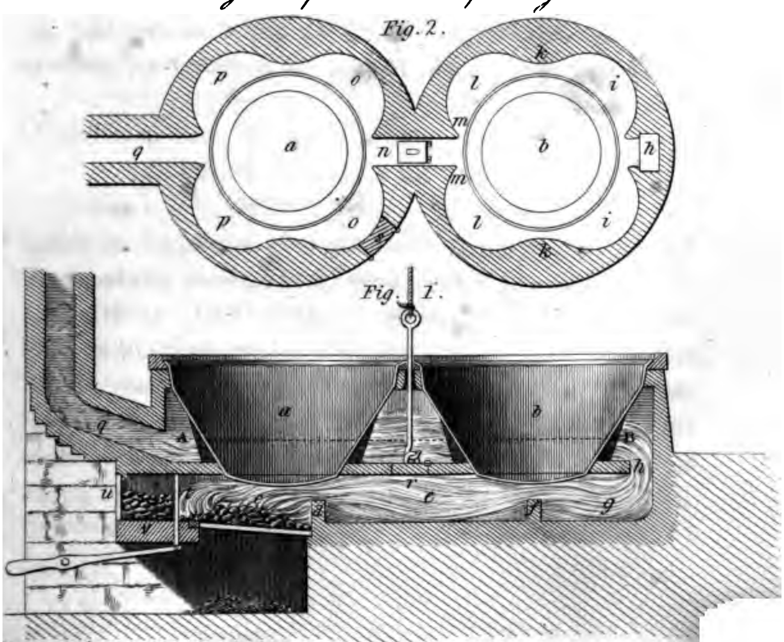
Fig. 6.



Partridges Improved mode of setting Boilers.

Fig. 2.

Fig. 1.



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of the front of the batten, and Fig. 5, the back of the same; by which the situation of the shuttles, and manner of fixing the slays will be seen, and also the construction of the driver. The front of the batten, Fig. 4, is formed by three planks, one of which is fixed to the top rail by a series of slay screws; the bottom plank is secured to the lower rail in a similar manner, and the middle plank is fastened to the slay rail by a series of screws or pins, as seen in the back view, Fig. 5. These screws must have shoulders, in order to leave an open space between the back of the plank and the slay rail, for the action of the drivers.

The shuttles, made according to the ordinary construction, are introduced in the races between the planks, and the horizontal action of the drivers impels them to and fro through the warp, in the usual manner. The driver in the ordinary engine loom is formed like a ladder; but in this improved loom it is made with teeth extending from the top and bottom rails of its frame, shewn by dots; and these teeth may, if it should be thought desirable, be united together for the purpose of giving them stability, by diagonal pieces crossing the middle of the batten.

The general operation of the loom will be understood by the following description:—*a a* fig. 3, are the rollers, upon which a sufficient quantity of the material is wound, to form two warps; from thence the threads proceed, (as shewn by arrows in the figure,) in the usual way, up and down over the weighted pullies, to the back slays *b;* then under the warp rollers *c*, to the leashes *d*, which are looped to arrange with each set of warps, and through which each distinct warp passes to its respective slay. The raising and depression of the treadles *e*, worked by the feet of the weaver, cause the leashes alternately to move up and down, by which the warp threads are opened; the batten *f*, is then pushed back, and the shuttles passed through the open space

between the threads. The shifting of the treadles and leashes now causes the intervention of the threads to be made fast, which are beaten up firm, by bringing the batten *f*, forward. The continued action of the loom in this manner, and the passing of the shuttles to and fro, produces that intervention of the warp and weft which is the ordinary operation of weaving.

The work thus woven is drawn off through small apertures in the breast pieces *g*, and thence proceeds to the work roller *h*, over which it passes up to the back castle *i*, where it is distended by the weighted bags and pullies; from thence it is carried over the top castle *k*, and through holes in the work castle *l*, where it is made fast by wedges, to prevent it from running back, and as the length of the work accumulates, it is wound round the bobbins *m*.

Though it has been thought necessary to describe the whole construction and operation of this improved engine-loom, yet it is to be understood, that the invention claimed by the patentee consists merely in "the new arrangement of the shuttles and the slays as connected with the batten and the knitting of the leashes, to arrange with the same in the manner above described."

[*Inrolled, March,* 1823.]

To THOMAS ROGERS, *of Store-street, Bedford-square, in the County of Middlesex, Esq. for his Invention of a Method or Apparatus for the purpose of attaching Trousers and Gaiters to Boots and Shoes.*

[Sealed 26th December, 1822.]

THIS is a fastening to be attached to the sides of trousers and gaiters, from which a chain is to pass and hook on to an

eye fixed in the side of the shoe or boot, for the purpose of keeping down the lower part of the trousers or gaiters; but at the same time affording a certain degree of elasticity. This newly-invented fastening consists of a tube containing a helical or worm spring. A rod passes up the middle of the spring, and is made fast to it at top, and a loop or eye, at bottom of the rod, receives the chain. Plate X. Fig. 2, shews one of these fastenings, intended to be secured to the side of the trousers or gaiters, by sewing or otherwise; the scroll part is simply an ornament of metal, to be placed on the outside. The figure exhibits the back or inner part of the apparatus: *a a*, is the tube containing the spring, which is shewn by dots; *b*, is the small rod attached to the upper part of the spring, with the loop at its lower end, from which the chain hangs with a hook at bottom.

Three studs, *c c c*, extend from the back of the ornamental parts of the apparatus, which are intended to be passed through corresponding holes cut in the trousers, and by that means, they may be attached or detached with facility; but if it should be thought more desirable to employ this improved fastening, without the ornamental scroll-work, then it is proposed to attach the tube to the sides of the trousers by means of sewing, and for that purpose, a thin edge of metal with small stitch-holes must extend from the sides of the tube.

In order to keep the tongue of the gaiter, or the edge of the trousers, close to the instep, a thin plate of steel, bent to the form, is proposed to be stitched on the inside of the gaiter or trousers, and a small stud or button, with a broad base below its shank, is to be put through the upper leather of the shoe, and after passing the stem part of the stud through a small hole in the steel plate, a rose ornament may be attached to it to keep the stud fast, and confine the tongue of the gaiter or the edge of the trousers.

The patentee states, that there may be various modes devised of attaching this invention to the lower parts of trousers and gaiters, or other articles of dress; but those above described he prefers. The shape, as to ornament and size, is of no importance, nor the materials of which it is made, provided they are suitable; "but a spring attached to the lower part or parts of trousers, or other articles of dress, whereby they are attached to a strap under the foot, or otherwise, and a spring attached to gaiters aforesaid, being, to the best of my knowledge and belief, entirely new, &c. &c. I propose to maintain an exclusive right and privilege to my said invention."

[*Inrolled, June,* 1823.]

To William Pass, *of Curtain Road, in the Parish of St. Leonard's, Shoreditch, in the County of Middlesex, Dyer, for his Invention of an Improvement in Calcining and Smelting of various description of Ores.*

[Sealed 20th December, 1822.]

This improvement in calcining of ores consists in certain peculiarities in the construction of calcining furnaces; the first of which is designed to supply the furnace with fuel. Plate X. fig. 1, shews the plan proposed by the patentee; *a*, is the furnace; *b*, a feeding-hopper, intended to contain a quantity of coal, which is to be pushed forward to supply the grate with fuel after it has become ignited, instead of distributing it over the furnace in an unkindled state; by these means the smoke will be consumed and converted into flame. The second part of the improvement is the introduction of an additional fire-place, *c*, to be sup-

plied with coke, culm, charcoal, or other fuel; the use of which additional fire is to intercept the vapours emitted from the furnace, and thereby cause any volatile matters arising from the smelting process to become metalized and fall into the receiver *d*, while the lighter parts will pass into the flue *e*, and be there condensed or collected by any of the usual modes employed for that purpose. The third part of the improvement is designed to avoid the necessity of employing a high chimney. In order to produce a sufficient draft in the furnace, it is proposed to apply, at the farther end of the flue, the well known apparatus called *centrifugal bellows*, which is to be worked by any first mover; this is intended to draw the fumes from the flue, at an orifice or opening made in the external cover of the bellows, near its centre, and to expel the same by its centrifugal force, through another opening made in the cover, near its periphery.

The patentee concludes his specification by stating, that he does not mean to claim a feeding-hopper as his invention, "such having already been applied to other furnaces; but not, I believe, to furnaces for calcining or smelting ores; and which latter application of it I hereby claim the exclusive privilege of using during the term of my said letters patent. Neither do I hereby claim the application of the centrifugal bellows to furnaces in general, but only the application thereof to furnaces for calcining and smelting ores. I believe the introduction of a second fire-place and fire, as applied to the furnaces for calcining and smelting ores, to be entirely new, and therefore I hereby claim the same as being my invention."

[*Inrolled, June,* 1823.]

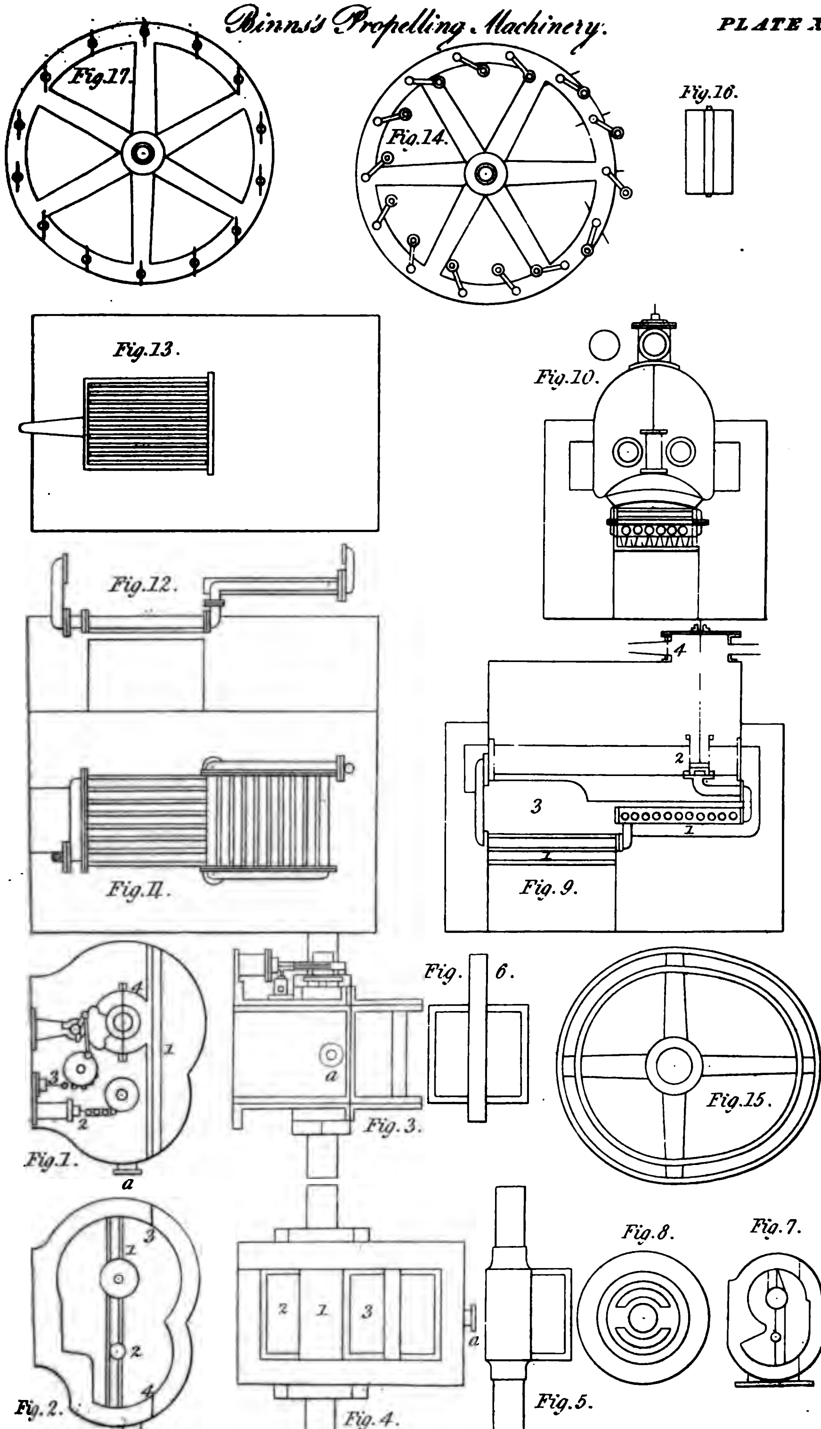
To THOMAS BINNS *and* JONAS BINNS, *both of Tottenham Court Road, in the County of Middlesex, Engineers, for their Invention of certain Improvements in propelling Vessels, and in the Construction of Steam Engines and Boilers applicable to propelling Vessels, and other Purposes.*

[Sealed 18th October, 1822.]

IT has heretofore been our undeviating practice to describe the principles and general operation of those inventions which have come under our notice, without reciting their specifications literally; in doing which, we have necessarily imposed upon ourselves the task of understanding the objects and views of every inventor, that is, as far as they have been intelligibly detailed. The specification before us we have carefully perused several times, but are utterly at a loss to discover what are the plans or intentions which the patentees have in view. We are therefore under the necessity of giving the whole of that document *verbatim*, and also a *fac-simile* of the drawing accompanying it, which will be seen in Plate XI.

"We, the said Thomas Binns and Jonas Binns, do hereby declare, that the nature of our said invention, and the manner in which the same is to be performed, are particularly described and ascertained in and by the drawings hereunto annexed, and the following description thereof, (that is to say,) Fig. 1. Front view of the rotary steam-engine. No. 1. A front view of the flanches which open for packing the pallats working in the cylinder of the engine. No. 2, represents a small steam cylinder to produce a re-action,—the steam being always on the top of the piston, which is raised when the running pallat opens the re-acting pallat, and is instantly

Binns's Propelling Machinery. PLATE XI.



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shut by the elasticity of the steam therein: it is intended to work by means of either a double or a single cylinder. No. 3, represents the same method as above, for either opening or shutting the steam cock by elasticity of steam. No. 4, represents the packing box and plummier blocks for the axis of the running pallat to work in. Fig. 2, is a section of fig. 1, describing the running and re-acting pallats, also the spaces for packing. (See Nos. 1 and 2, and Nos. 3 and 4, which describe where the cylinder opens for that purpose.) Fig. 3, is an end view of fig. 1, describing in what way the packing-box and flanching are screwed together, and *a*, *a*, *a*, *a*, the nose where the steam flies off in figs. 1, 2, 3, and 4. Fig. 4, a view of the cylinder when open for packing. No. 1, the shaft to which the running pallat is fixed; 2, the running pallat; 3, the re-acting pallat.

"The grooves round the pallats are to receive the packing, over which iron plates are screwed down to tighten the same. Fig. 5, represents the axis to which the running pallat is attached; the shoulders of which receiving the end packing. Fig. 6, represents the re-acting pallat with grooves to receive the packing. Fig. 7, is a plan describing in what way it may be used as a rotary pump for air, water, or any liquids. Fig. 8, represents a metallic packing box, to reduce friction by packing from the centre. Fig. 9, is a section of a steam boiler, the steam in which is generated partly by means of tubes surrounded by fire and flame. It likewise consumes its own smoke, and has, in addition to the usual safety valve or valves, a safety plate, as herein after explained. Nos. 1, 1, represent the tubes surrounded by fire and flame. No. 2, a lift or force pump, which causes the water alternately to pass through the tubes surrounded by fire and flame. No. 3, represents the form of the bottom of the boiler, which forces the smoke upon the fire, and pro-

duces combustion, and consequently becomes a very simple and effectual smoke-consumer. No. 4, represents the flanches, between which a thin metallic plate is placed, (which is called the safety-plate,) calculated to give way at a much less pressure of steam than any other part of the boiler. The steam escaping is conveyed by a tube into the chimney, and totally prevents the possibility of accident by explosion.

"Fig. 10, represents an end view of the boiler, smoke-consumer, pump connected to the fire-tube, and the safety-plate. Fig. 11, is a ground plan of the tubes to be surrounded by fire and flame, as represented in fig. 9. Fig. 12, is a side view of the tubes, describing the mode of connecting them to the boiler. Fig. 13, is a plan of moveable fire bars, to work on bearings. When disengaged, it drops into the ash-pit, cleaning the same with greater facility.

"Fig. 14, represents an end view of a wheel to propel vessels, describing in what manner the paddles are changed by a plurality of levers fixed to the axis of the paddles, to which are also attached, at the other ends of the levers, friction rollers, working in an excentric groove. Fig. 15, is an end view of the frame, describing the excentric groove, in which the friction rollers work, causing the paddles to open at a proper angle for propelling and closing them again when done. By alternately acting in the way described, the paddles get clear of the back water. Fig. 16, is a plan of the paddles to which the lever is attached, and referred to in fig. 15. Fig. 17, an end view of another method of working paddles for propelling vessels, the paddles of which are always in a vertical position, in consequence of being loaded at the bottom edge proportionate to the surface of the paddle; in every other respect the paddle is the same as the one described in fig. 16, and intended to be worked with or without guides."

[*Inrolled April,* 1823.]

To Charles Tuely, Sen. *of Kenton Street, Brunswick Square, London, Cabinet Maker, for certain Improvements applicable to Window Sashes, either single or double; hung, fixed, Sliding-sashes, Casements, Window Shutters, and Window Blinds.*

[Sealed 1st November, 1821.]

The object of these improvements as they respect the sashes of windows, are to enable the window frames to turn inside out, for the purpose of cleaning, glazing, or painting them within the house, instead of exposing the persons employed in doing this business, to the danger of falling from any temporary projection on the outside of the house. The mode by which this is effected is to suspend the sashes by pivots near their centre, either horizontally or vertically. In windows with double sashes sliding up and down, it is proposed to make two sliding rails to each sash, fitted to ribate on the sides of the window, in which the sash is to slide. To these two slide rails, each sash is attached by a hinge or tumbling joint, placed about the middle of the sash, and upon these joints it turns over when required; the mouldings of the rails and frames being cut so as to produce a close joint on both sides, when the window is shut. A spring bolt in each rail, prevents the sashes from turning over as they slide up and down, it is therefore necessary to bring the top sash nearly to the bottom, and the bottom sash nearly to the top of the window, to release these catch-bolts, before the frames can be turned over. The same principle is applicable to every sort of window, whether they have double or single sashes, or are made to slide horizontally or vertically, and also to casements, blinds, and shutters.

A plan of a very similar kind to the above, and having the same object, was some years ago submitted to the

Society of Arts, by Mr. G. Marshall, of Cecil Court, St. Martin's Lane, London, when a Reward of Fifteen Guineas was voted to the Inventor, and the subject published in the XXVIII. vol. of their Transactions. The communication states that "in consequence of the numerous accidents which occur from cleaning and painting the outside of the windows," the inventor is induced to submit his model of a new invented sash window, (which is now to be seen in the Society's Repository.) "The present mode of cleaning or painting the outside of windows, is generally by persons leaning out of the window, or getting upon a plank, or some other convenience made for the purpose, projecting on the outside of the house; hence from carelessness and inattention many fatal accidents have occurred."

The model of the window, "in appearance, resembles a common sash, and the upper or lower sheet may be moved up and down in a similar manner; besides which, by pushing two small springs back in the upper, and at the same time pulling the sash inwards, you may turn the outside of the sash towards you into the room, so that it may be easily painted, glazed, or cleaned, by a person standing within the room, without the necessity of removing the slips or beadings, by doing which in the common mode, the glass is frequently broken and the beads lost, left loose, or mis-matched, and a considerable expense incurred. Old windows may be altered to act upon this principle, at an expense of twelve shillings per window; and new sashes and frames may be thus made for only six shillings more than the common price."

A design exactly like this, was some time back submitted to us as a new invention, by Mr. Mathias Saul, of Lancaster, but knowing that the plan (though undoubtedly a genuine invention of that gentleman,) was already before

the public, we declined inserting it in the London Journal of Arts; his papers have however subsequently appeared in the Repertory of the Arts, vol. XLI. N. S.

A second project described in Tuely's Specification, is a window fastening to be attached to the meeting bars; it consists of a clasp which folds down from the bottom rail of the upper sash, into a recess formed in the top rail of the lower sash, and is made fast by a spring bolt, which enters a mortice hole in the meeting-bar, but may be released by pressing upon a thumb stud in the usual manner of that description of fastenings.

It is further proposed to construct venetian blinds with radiating rails or laths, instead of vertical or horizontal laths, as is the usual manner of making that description of blind. These laths give a very novel and pleasing appearance to the blind. The square frame is occupied with laths radiating either from one corner or from the centre, and the turning of the laths, so as to present either their edges or broad sides, is effected by circular sliders or segments. The mode by which this shifting of the laths is produced in the ordinary construction of blinds, is by attaching the individual laths each by two pivots, to a pair of parallel bars; hence by sliding the bars in contrary directions, the broad or thin edges of the laths may be presented to view at pleasure; in the improved blinds, with radiating laths, the parallel sliding bars to which the laths are attached, are formed either in circles or segments, and by sliding them a short distance round, the position of the laths are changed exactly as in the ordinary kind.

The centre of the blind which contains the sliders must be supported by a cross bar, extending from the frame; and the sliders may be covered by a circular plate, containing any external ornament, as a star or sun. The frames which contain laths radiating from one corner must

have the sliders formed by segments, which may be covered by a quadrant plate, externally ornamented with any pleasing device.

[*Inrolled April,* 1822.]

To William Palmer, *of Lothbury, in the City of London, Paper Hanger, for his Invention of certain Improvements in Machinery for the purpose of Printing or Staining Paper for Paper Hanging.*

[Sealed, 22d April, 1823.]

This invention is an apparatus for printing by means of a wooden block, with a raised device, the mechanism of which affords the means of supplying the paper to be printed, and of procuring a perfect register, of administering the colour to the block by means of an elastic roller; and of producing the necessary pressure by which the impression is given. All these objects are effected by a combination of mechanism, actuated by hand, or any other first mover.

Plate X. fig. 3, is a representation of the apparatus, which is constructed upon a strong frame-work of wood. The paper to be printed is first cut straight on one side, and then tightly rolled upon a cylindrical rod, with pivots, and placed in forked bearings, as *a*. The paper is passed under a board, *b*, which rises upon hinges, and has a thin open space, shewn by dots, for the purpose of guiding the paper; and there is also a mill board, *c*, designed to keep it flat: *e*, is a drum-wheel, and *f*, a roller at the other end of the machine, over which an endless web of fustian is extended and drawn tight by a thumb-screw; this web is to carry the paper forward: *g*, is the table, formed by a

Palmer's Printing Apparatus.

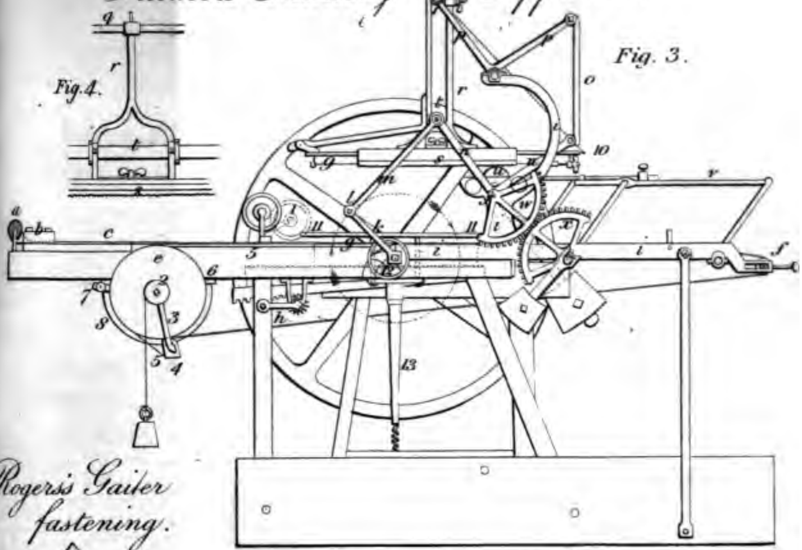


Fig. 4.

Fig. 3.

Rogers's Gaiter fastening.

Fig. 2.

Extraordinary Parhelia.

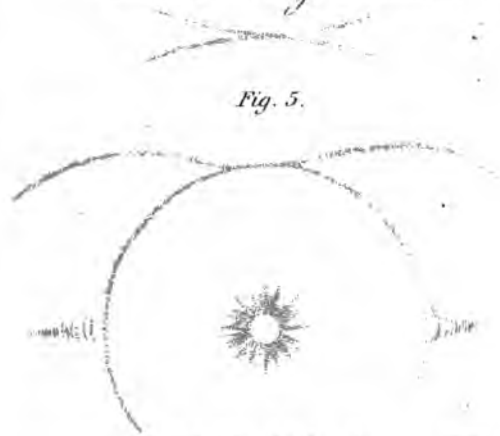


Fig. 5.

Pass's Smelting Furnace.

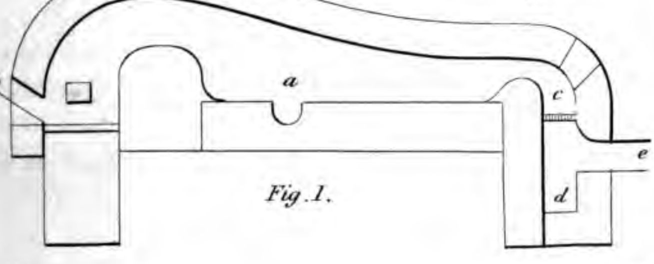


Fig. 1.

W. Newton del.

S. Bellin

slab of stone, (shewn by dots,) resting upon and bedded on to an iron frame, shewn also by dots, supported by the wood work. The stone slab must be perfectly flat, and smoothly covered with fine cloth, stretched tight over its upper surface, and made fast by stitching on the sides; the adjustment of the iron frame and table is obtained by a small rack and pinion, *h*, which acts under the inclined plane, and thereby raises the frame-work.

Two iron frames, *i*, *i*, *i*, attached on the outsides of the woodwork, with their bent arms standing up, carry the pivots of all the levers and shafts, by which the machinery is worked: *k*, is a crank fixed on the main shaft, to which a handle *l*, may be attached for giving the rotatory motion to the whole. A rod *m*, connects the crank at *t*, to the lower double lever *n*, *n*, which lever moves upon pivots, resting in the frame *i*. At the reverse end of the double lever, a connecting rod *o*, extends to the upper double lever, *p*, *p*, the pivots of which are supported at the top of the arms of the frame, *i*, and by this connection the two double levers move parallel to each other. The end *q*, of the lever *p*, is attached to a rod, extending across the machine, and which carries the fork *r*, shewn detached at fig. 4, and fastened at its lower end to the printing-block, *s*, and to the cross shaft of the joint, *t*, thereby connecting the action of the parallel levers at their joints, *q* and *t*: thus, by the revolution of the crank *k*, the printing-block is raised and depressed, and the action of the whole being regulated by a fly-wheel.

An arm extending from the frame *v*, carries the colouring roller *u*, which is, by the parallel motion of the frame, made to bear against the underside of the printing-block *s*, and is also carried backward and forward in contact with its surface. This part of the apparatus is worked by a pair of toothed sectors, the upper one, *w*, being fixed on to the

square end of the pivot *j*, of the double and lower lever *n*; the lower one *x*, is fixed upon a square spindle extending from a lifting lever attached to the parallel frame. It will hence be seen that the rising of the crank *k*, in the direction of the arrow, lifts the block *s*, and, at the same time, the toothed sector *w*, works the toothed sector *x*, and thereby raises the parallel frame, and carries it along, so as to keep the colouring-roller *u*, traversing in contact with the under side of the printing-block; the whole moving by parallel actions simultaneously.

The colouring-roller has an elastic surface, made either by several coverings of cloth and oil-skin, or a composition of glue and treacle, as printers' inking-rollers are generally made: it is placed in a pan or dish containing colour, and revolves between two small rollers, which spread the colour equally on its surface. There is a loggerhead, or heavy weight, fixed to an arm extending down from the double lever *n*, which is intended to balance the machinery. There is also a weight, attached by an arm to the sector *x*, by which the parallel frame *v*, is assisted in rising, and the colouring-roller pressing against the block.

The general construction of this machinery having been thus explained, its operation in printing the paper hanging will be clearly understood by the following description. The paper wound upon the rod *a*, as above said, is passed under *b* and *c*, and drawn on to the endless web; it is held there by the roller, 1, turned down, as shewn by dots, which presses upon it: the drum *e*, is then passed round by hand, which carries the endless web forward, and with it the paper. It is, however, necessary to regulate the distance which the paper shall advance from time to time, in order to procure perfect register; this is done by a contrivance which will be explained. On the end of the axis of the drum *e*, there is a rigger equal in diameter to the drum,

and also a pulley, 2; round this pulley acord is twice wound, and a weight suspended to the end of the cord; there is also affixed to the pulley an arm, 3, carrying a small wooden block, 4, intended to act as a pall upon the periphery of the rigger, as the arm advances, but not as it returns. To the end of this block the cord, 5, is attached, by which the drum is pulled round by the hand of the printer.

All the parts of the machinery being prepared, and the paper laid on the endless web, and pressed by the roller, 1, as described above, the printer, by pulling the cord, 5, draws the arm, 3, from its resting place at the stop, 6, by which act the cord, 5, causes the pall, 4, to carry the rigger, and also the drum, *e*, round with it, and thereby the endless web, and the paper intended to be printed, is made to advance in the machine. But as the quantity of revolution given to the drum will determine the distance which the paper is carried forward, it will be necessary to adjust this with the greatest accuracy, in order to obtain perfect register; this is done by an adjustable stop, 7, which may be screwed to any part of the circular plate, 8, and will determine the distance which the arm, 3, shall proceed at every operation. The cord being released by the printer when the arm strikes against the stop, enables it to return to its place of rest, to which it is carried back by the gravity of the weight, leaving the rigger and its drum, with the web and paper, stationary.

The revolution of the crank, *k*, as above described, will work the colouring-roller, and bring down the printing-block to produce the impression upon the paper by means of the levers and rods, particularly explained above. As it is possible that the paper, when printed, may stick to the block, a contrivance is connected to the levers, which shall push the paper down as the block rises. This is called a bow, consisting of a frame *g*, moving upon a joint, with

a cord stretched tight. As the printing-block rises, this bow, suspended by a cord, 10, will be pressed down, and effectually remove the paper from the block. There is also a contrivance by which the edges of the paper are held fast to the table, when the block is about to impress it. 11, 11, is a bar (the same on both sides of the machine), with fingers extending from it, which press upon the edges of the paper. This bar is made to rise and fall by an eccentric roller, or cam, 12, upon a main axle which acts between two parallel plates attached to the bar, 11; there is a standard, 13, with a helical spring at bottom to assist the operation of this finger-bar.

The specification concludes by saying, "In order to identify and distinguish as clearly as possible the particular parts and combinations of machinery applicable to the manufacture of paper-hangings, I hereby declare, Firstly, that I claim the sole right of applying pressure to the roll of paper to be printed, and to the wire or axis upon which the paper is coiled, by which pressure the straight edge of the paper, after it is uncoiled from the roll, may be continually forced against a fixed guide; the guide being so placed that the paper does not come in contact with it until uncoiled, and also the use of a plain roller applied upon the paper which, when combined with the fustian, or other endless web, will effect the passage of the paper through the machine in one continued right line: and I hereby further declare, Secondly, that I claim the sole right of using a crank, which I call a driving-crank, in the way I have described, for giving pressure to the printing-blocks in paper-staining, and also of using two other cranks, one of which I call a principal crank, and the other a parallel crank, by the use of which, in the way I have described, the printing-block may be raised parallel to the slab on which the paper is printed. And, Lastly, I hereby further

declare that I claim the sole right of applying colour to the under surface of flat blocks in paper-hanging manufacturing, by means of a roller or rollers, when such blocks are attached to machinery for the purpose of printing paper for paper-hanging."

[*Inrolled August*, 1823.]

To GEORGE RICHARDS, *of Truro, in the County of Cornwall, Architect, for his invention of certain Improvements in Fire Grates, Stoves, Furnaces, and other Inventions for the consumption of Fuel; and in the Flues connected with them, whereby they are rendered more safe, and the Smoke prevented from returning into the Rooms in which they are placed; and also for an Improved Apparatus for cleansing the same.*

[Sealed 26th December, 1822.]

THESE improvements, as far as we can collect them from the Specification, seem to be rather ideas *intended* to be digested into a tangible form, than any thing really projected. The patentee purposes to "make all kinds of grates and stoves to fix into metallic fire places or cases," these he intends to be lodged in suitable recesses or fire places, "leaving a vacancy behind the back part of about two inches" (deep, we suppose,) which vacancy he terms a rarefying box, this may be formed of thin iron or brick-work properly plastered, before the metal fire place is set in. It is also intended to "make to these fire places inner and outer hearths, instead of marble or any other material." The inner is to be "sunk below the outer, to allow of a dust or ashes vacuity, with a moveable grate or perforated metallic screen over it."

"Above the grates, at a proper height," it is proposed to "make a regulating valve, so constructed that when the cold atmospheric air presses down the chimney flue from eddy wind, or any other local cause which may prevent the ascension of the smoke, it may be conducted into the rarefying box, and its ill effects be there destroyed, instead of finding its way into the room." A door is to be made at the bottom of the metallic back to discharge the soot when the flue is swept. The flues of all chimneys are proposed to be made with metal plates, fastened together by tye-straps, and finished at top with neat architectural caps.

Kitchen ranges, and cooking apparatus, and all other kind of grates, are also to be made "upon an improved principle," (viz.) "the two horizontal bars at bottom and top, or occasionally the two at bottom only, to form the segment of a circle, or any other pretty curve upwards; so that from either heat or cold, if contraction and expansion take place, the body of the grates may never sink down." The whole of the other bars of the grates are to be placed vertically, and "made hollow with receiving and discharging atmospheric vents." Cooking apparatus are also to be made with sliding ovens, boilers, and hot closets, to regulate the length of the fire; these may be heated by separate fires. The ranges are to have no fall-down bars, but when the fire is to be contracted the bottom is to be raised up; and if without ovens, boilers, or hot closets, an atmospheric vent-hole is to be made in the back.

"The vertical ranges may be made with sliding cheeks on a new principle; the top of boiler and oven to serve as a hot plate, and a plate also to hang or turn down over the fire-place, as a hot plate," with different culinary conveniences for boiling, stewing, and steaming in the back part. Concave metallic *roasting hasteners* are also to be made, upon an entire new principle, so that they may e connected

with the grates, and be put in their position, and removed out of it, to allow the dripping of the meat with the greatest facility and adroitness." What these new principles may be we do not know; the specification is silent on these points.

Fenders are to be secured to the inner hearth by sliding studs. Fire-screens are to have "a groove, or rising, on the inner hearth, in an eliptical form, to embrace the lower parts of the screen, and by a worm, bent wheel, or other mechanism, the parts are to be brought forward and backward to meet the centre." The fire-irons are to be set with "a stepping in the hearth, and a rest connected with the fender, to preserve them in an independent vertical position." Pokers are proposed to be made with "a moving fulcrum, to suit the vertical grates, for stirring the fire."

"I also (says the Patentee,) make furnaces with these fire-places, flues, and stops of cast-iron, whereby the fire is detained beneath the bottoms, and all round close to the sides of the boilers, until the whole strength of the combustion of the fuel is quite exhausted. This improved application of a metallic furnace for brewing, sugar-refining, for distilling, and every other purpose where fire is applied under any metallic vessel for boiling a fluid, is of the first importance; the fire-door too, have a lining on the inside, to prevent the chilling action of the atmospheric air."

An improved apparatus is mentioned for sweeping chimneys of all descriptions, and explained as follows: "I make a metallic case to suit or fit chimney-pots, of brick or other substance; this case contains an open metallic cylinder, with a projecting flanch on its outer top edge. The use of this is to prevent the operation of eddy winds from an easy entry (after rebounding against the pot) into the flue; the cylinder is made to turn easy on its pivots, and the case I

fix in a secure manner to the top of the chimney," (or extremity of an horizontal flue.) "This being done, a whalebone needle made with brass ferrules, and jointed in short lengths, with a swivel friction roller at the fore or lower end, is put down the flue; and however crooked and intricate, this needle will reach the bottom or extreme distance, to which a small line is fixed; the line from the bottom end is then taken off, whilst the line at the top is held by the person who sent down the needle. The needle is then drawn up the chimney, and folded together in its joints, and the person above puts a strong well made metallic chain properly over the cylinder, and securely fastens the both ends to the line or cord, the person below then pulls it down."

If the soot adheres very firmly to the chimney, it is proposed to attach a scraper to the above, this is to be made to scrape on one side only, and to be pressed thereto by a spring, and to operate in its descent only; a whalebone brush is also to be used made square or cylindrical, and attached to the chain; but differently formed scrapers and brushes are to be made, suited to the chimney in which they are to be employed. In case of the chimney taking fire, it is intended "to make a swab of the thrums, or any other like material, and secure them to a cylindrical block, which swab is to be made completely wet." In this state it is to be drawn up and down the chimney by means of the chain above-mentioned, until the fire is extinguished. Every house is to be provided with an apparatus of this kind. Chinese chimney caps are also to be made either of metal or earthenware, in order to screen the metallic chain and cylinder, within the chimney, from the effects of rain and snow. Wooden frames are proposed to be made to fit the mantel-piece, and cloths to be attached to these frames,

with sleeves in the cloths for the chimney-sweeper to put his hands through; the object of which is to exclude any of the soot from the room.

[*Inrolled June,* 1823.]

Original Communications.

On the Phenomena, called Parhelia, or Mock Suns.

To the Editor of the London Journal of Arts.

Sir,

These Phenomena, which frequently appear, too often pass unnoticed, though they are well calculated to excite the attention of all who view them; I shall therefore, with your permission, through the medium of your Journal, endeavour to make them more known, by giving a summary view of my observations upon them for a few years past.

The particular brilliance of the parhelion which appeared on the morning of September 1st, has been the principal cause of my sending you this paper; on that morning, a little before seven o'clock, the parhelion was so brilliant for a few seconds, as to dazzle the eyes; its form, contrary to that of all I have before seen, was circular, and equal in appearance both as to shape and brilliancy, to the real sun.

Though various conjectures have been offered concerning these phenomena, yet the theory of them does not seem to have been determined; they are formed by the reflection of the sun's beams on a thin cloud, so posited as to receive the prismatic colours; they are usually accompanied by a luminous circle, called a halo, on the circumference of which the parhelia are generally formed; their distance from the

sun is either about 22 or 45 degrees: their colours generally resemble those of the rainbow, the red and yellow are on that side nearest the sun, and the blue and violet on the other.—Parhelia are sometimes double or triple, and we have accounts of five parhelia having been seen at once, in the year 1629, at Rome, and of another seen at Arles consisting of six, in 1666.

M. Mariotte accounts for parhelia from an infinity of little particles of ice, floating in the air, that multiply the image of the sun by refraction or reflection, and by a geometrical calculus he has determined the precise figure of these little icicles, their situation in the air, the size of the luminous circles which accompany the parhelia, and their colours.

Mr. Heygens accounts for the formation of a parhelion in the same manner as for that of the halo; viz. That there are certain globules in the atmosphere, consisting of a coat or shell of transparent ice or water, containing an opaque nucleus within; and that these are made from particles of snow, (which is in itself opaque,) attracting the aqueous particles in the vapour, or exhalation, by which it is sustained; these gathering together, form the semi-pellucid shell of water, or are frozen into a crystalline shell of ice, and this, he thinks, is proved to be matter of fact by the hailstones which fall to the earth; for these, says he, when broken, discover some snow at the centre.

The most singular appearance of haloes and parhelia, that I ever observed, was on April 6th, 1820, which will be more readily conceived by the figure, exhibited in Plate X. than by description; the diameter of the interior halo measured 45 degrees, the distance of the upper, from the circumference of the lower was about 22 degrees; the parhelia were not formed upon the circumference of the halo, as in general, but at a distance of about 2 degrees from it.

During the months of April, and May, 1820, the above phenomena presented many interesting appearances.

For more information on the subject, I refer your readers to captain Parry's Voyage of Discovery, or to Mr. Fisher's volume on the same subject.

I am, Sir,
Yours, &c.
CHARLES H. ADAMS.

Lower Edmonton.

To the Editor of the London Journal of Arts, &c.

SIR,

A short time since, in company with two intelligent foreigners, I visited the Repository of the Society of Arts, in the Adelphi; it was my first visit, and my imagination had fixed upon a scene so very different to that which met my view, that, with national pride, I had overrated the visionary trial to my companions; but how completely did the reality belie my eulogium! You cannot picture the ridicule of my companions, and of my shame and vexation at a sight so widely different to what I had prepared them for, and myself anticipated. Models, triumphs of art, ostensible proofs of the utility of the society, and of the genius of our countrymen, lay mutilated, dirty, and piled one upon another in the utmost confusion. We wished to examine several, and did so, but not one of them, that could by any means be disengaged, was in its proper order; all were clogged with dirt, or had met with a disaster of some kind. As I endeavoured to rectify one of them, I blushed for those who seemed so little inclined to do so for themselves. Every one will be of opinion (except perhaps, the members of this society) that the models, &c. as permanent trophies and sub-

stantial records of the service of the institution, should be preserved with care, and arranged with the greatest neatness—it is a duty that the society owes both to the nation and to itself; and surely it is neither unjust nor difficult to be complied with.—May we believe report that calls this institution wealthy? I am in hopes that you will visit this chaos, and favour the public, the worthy members, and myself, with your opinion of it.

Allow me a few moments more of your attention, while I lay before you a thought that has very frequently occurred to me, and which this visit has rendered me more desirous of submitting to the considerations of a more competent judge of its utility than myself. It is the formation of a new society, for the advancement of practical knowledge, which in my humble estimation, seems likely to be of more real benefit to science, and more nearly to approach the views of our great "Father of Philosophy," than any one now existing. All those institutions, with whose plans I am acquainted, do indeed most liberally reward *the productions* of merit, however humble; and by honorary, or lucrative stimulants, they rouse modest talent to emulative exertion, and thus are of very essential benefit; but the door is still open to improvement,—perfection is not yet attained, and until it be so, it is the duty of every well wisher to science, to offer aught that may seem to him to lead towards it. The mite that I would offer, and deem of such value is simply this. Would not these societies be of more substantial utility, were they to assist in maturing the crude theories of those whose straitened circumstances deprive them of the capability of prosecuting and perfecting them? Would it not be infinitely more advantageous to assist an individual *in his researches*, than to reward him only on *the completion* of his labours? A completion but

too often unattainable from the great expence attendant on the requisite experiments? How many inestimable additions to knowledge may there not be lost through this pecuniary inability; for, from the selfishness of human nature, the great bulk of mankind would carry their discoveries with them to the grave, rather than leave the laurels due to them to be worn by others less deserving, though more fortunate. With a view to remedy this, I have sketched a plan for an institution to examine and prove the projects, &c. of needy genius, and I am sanguine enough to hope that it would fully answer its intention and be productive of eminent service to philosophy; for in addition to the advantages possessed by other societies, it would secure to the public important experiments, and useful discoveries, that must otherwise fall into oblivion. It would kindle latent sparks of genius, that might otherwise for ever remain concealed; by its aid and patronage, merit would be ushered into the world with greater dignity; would meet with greater protection, and excite greater emulation. The fields of knowledge would be carefully gleaned of every straw, while other institutions do but gather such casual ones as obtrude upon their path: uncultivated genius would find able directors in the members of this institution, who would become so by *merit* only—not by the caprice of ballot, nor their capability of paying the annual subscription. The schemes of projectors would meet with adequate judges, and if worthy, would receive every encouragement and assistance, both from the talents and the treasury of the society. The monopoly by patents, might, by judicious arrangements, be in a great measure prevented, and the public receive the full benefit of all that may be useful to them. So numerous are the advantages that present themselves to my *willing* imagination, that were I to descant upon them, I should, I fear, encroach too much upon your

valuable time. Possessing too little influence in the world, to propose to it such a scheme unpatronized, and too little ability to support it, I have ventured to intrude upon you, hoping that should you deem it at all worthy of notice, you will place it in view of those most likely to promote its well-being, under the auspices of your valuable Journal, which offers such free communication, and has so much influence with the scientific world. In this event I shall be proud to lay before you the rough draught I have formed of its plan; but should you, on the contrary, disapprove of it, my motives will I hope be deemed as sufficient excuse for thus trespassing upon you.

I am, Sir,

Your very obedient servant,

G. D. B.

8th September, 1823.

We should be obliged if G. D. B. would take an early opportunity of favouring us with a call.—Ed.

To the Editor of the London Journal of Arts, &c.

Sir,

Having observed in the Number of your Journal for June last, and also in the present of September, an account of welding together the edges of thin plate iron, and understanding that the material used as a flux, is considered to be a secret, and confined to the few persons who practise it: without knowing any thing of the materials employed at Birmingham, or in America, I beg to inform you that I have invented, and for some years practised a mode of welding together two thicknesses of cast steel, or iron and cast steel, which process of welding is performed at a temperature very little above red heat.

I send you herewith several specimens of welding, two pieces of cast steel together, of iron and cast steel, and of thin sheet iron alone, and also an account of the process and materials employed. I melt borax in an earthen vessel, not in a metallic one, particularly brass or copper. After melting, one-tenth of sal-ammoniac is pounded and mixed with it. The two substances being well incorporated together in the fire, it is to be poured out on to an iron plate, and when cold, will produce a substance resembling glass. It is then to be pulverized, and mixed with an equal quantity of unslaked lime, which renders it fit for use.

In performing the operation of welding, the iron or steel must be first heated to a red heat, and then the pounded material scattered upon its surface, which will melt and run over it like sealing-wax. The iron or steel is then to be again introduced into the fire, and raised to a heat considerably below the ordinary welding-heat, (which proves itself by the cast steel,) when it is to be withdrawn, and immediately beaten by a hammer until the surfaces are perfectly welded together.

The composition is an invention of my own, and I have proved it for some years with never-failing success. Anxious to add my mite from time to time, to the advancement of the Arts, if this piece of information is considered by you as deserving of a place in your scientific work, it is very much at your service, and the service of the public.

I am, Sir,

Your's, &c.

AUGUSTUS SIEBE.

406, Strand, London.

Novel Inventions.

Perkins's Steam Engine.

We have great pleasure in stating that an engine upon the new principle is on the point of completion, by which Mr. Perkins intends to raise water, and thereby to demonstrate beyond the possibility of doubt, the absolute power of the steam, as generated and employed by him. This engine is expected to be in an operating state within a week of the present time, and will, we have no doubt, be exhibited to the enquiring public with as little reserve as possible. We have always entertained a favourable opinion of this invention, and look with no small anxiety to the ultimate proof of its advantages, being still persuaded, notwithstanding there are so many eminent engineers hostile to the plan, that Mr. Perkins has neither deceived himself nor intended to impose upon others. Feeling, however, that we have been the principal agents in giving publicity to this invention, and that from the information contained in our journal have been derived all the notices of its progress which have passed so generally current through the public press, we consider ourselves bound to declare our undisguised opinion of its usefulness, and shall therefore in our next, (if the engine is then complete) state fairly and fully the effects observable from actual experience, by which the public doubts will be set at rest, and the importance or fallacy of the invention satisfactorily established.

The Insensible Heat of High Pressure Steam.

In our Fifth Vol. page 204, under the head, Perkins's Steam Engine, we stated, that in permitting the high pressure

steam to escape through a small fissure in the apparatus, a most singular effect was observed, viz. that instead of the steam scalding as it blew out of the opening, it felt scarcely warm. This singular phenomenon has been so frequently exhibited to the visitors, that the fact is admitted beyond dispute; the theory upon which this singular effect is attempted to be explained, we now beg to submit to the consideration of our readers.

Mr. Perkins informed us that he had frequently observed, on opening the steam-cock of a high-pressure boiler, that the sensible temperature of the steam appeared to diminish as its pressure increased; and it occurred to him that the rapidity of motion caused by the great force of the steam in escaping, drove the atmospheric air before it, and thereby produced a partial vacuum, to supply which the surrounding atmospheric air rushed in, and mixing with the steam, reduced its temperature. We do not remember that Mr. Perkins attempted to explain this matter further, but we presume he supposed either that the steam was separated by the air, into particles so extremely minute as to render its caloric insensible, or that the air took up the heat by absorption.

An experiment has been made in order to ascertain the truth of Mr. Perkins's theory. He heated water in one of his generators to the temperature of 420° Fahrenheit, and suspended, by means of a cord and pullies, a cylindrical tube, open at both ends, of about eight inches diameter, and four feet long, perpendicularly over the stop-cock of the generator. The tube was placed with its lower end about a foot above the generator, when the steam was allowed to escape by opening the stop-cock through an aperture of a quarter of an inch diameter. The pressure from within caused the steam to rush with great velocity

completely through the tube, and was seen rapidly condensing, and trickling down its surface, the metal of which it was formed, remaining perfectly cold.

The tube was now lowered so as to enclose the stop-cock, its bottom aperture rested upon the upper side of the generator, and thereby allowing a very small portion of air to pass up the tube. The condensed steam immediately evaporated, and the tube became so hot, that it could not be touched by the naked hand. A thermometer was now introduced into the tube at the top aperture, which indicated a temperature of 230 degrees. The tube was again drawn up to its former position and soon became cold, allowing the condensation to take place on its sides as before.

While in this situation, with the steam blowing through it, a lighted lamp was brought within about two feet of the tube, level with its lower end, when the flame inclined toward the steam, as if blown by a current of wind. The lamp was slowly advanced towards the tube, and when within about six inches of the aperture the draft of air was so strong as to extinguish the flame.

On removing the tube, and bringing a lighted lamp within eight or ten inches of the jet, it was very evident that a strong current of air was pouring into the volume of steam and passing along with it. A thermometer on being introduced into the midst of the steam, at only one foot from its escape cock, indicated a temperature of 120 degrees. When removed a few inches from the centre of the current, the thermometer fell to 80 degrees, by which it was evident that where the air first entered the steam it was coldest. Two feet above the stop cock, in the centre of the steam, the temperature was 90, and three feet from the cock it was 80.

Cutting of Hard Steel by Soft Iron.

It has been recently discovered that a smooth circular plate of soft iron when made to revolve, with very great velocity, will cut hardened steel. The circumstances which led to this discovery, were an attempt to reduce the diameter of a circular iron plate, by placing it in a lathe, and applying a file to its edge; instead of the file reducing the plate, it was perceived that the iron made inroads upon the file, and every attempt to reduce the plate by hardened steel instruments proved ineffectual while it revolved in the lathe, with the rapidity there given to it. This singular effect has been noticed in the American Journals, where it was first discovered, but we understand that it has not been applied in that country to any useful purpose.

Mr. Perkins has tried the experiment in London, with perfect success, by placing a circular plate of soft iron, the twentieth of an inch thick, in a lathe, and when it was made to revolve with a speed equal to about ten thousand feet of its circumference per minute, deep incisions were made by the iron, in a common steel file. The theory of this operation is not satisfactorily made out, it is however supposed to have some connection with magnetism; we only vouch for the fact, having seen a file cut in the manner described.

Improved Masts for Ships.

A new and important plan of mast-making has been lately introduced, which is likely to be very advantageous in the naval service; its prominent features are, that masts for large ships of war, may be made at one-fourth the expense of the present method, of far more durable materials, and, by a peculiar combination of the several parts, they are not only

stronger, but any defective parts may be replaced, or any injury readily repaired, without taking the whole mast to pieces, which is the case at present. By an alteration in form, the head of these masts may be reversed, and the heels answer the place of their heads—this has long been considered a *desideratum*, and is likely to be important when masts are much wounded above the upper-deck by shot. Sir Robert Seppings, is said to be the inventor, and the plan is now being carried into effect, in the dock-yard at Portsmouth, in making main-masts for the Ganges of 84 guns, and Naiad frigate, and we understand it is also being tried at Chatham, in making a main-mast for the Spartiate of 78 guns. Mr. Smart, of Westminster, we understand, has a just claim to the merit of an invention which very closely assimilates to this. Indeed we question if it be not mistake which attributes the invention to Sir R. Seppings.

Polytechnic and Scientific Intelligence.

Royal Society.

This Institution has published the first part of its Philosophical Transactions for 1823. The proportion of *practical* subjects it will have been seen by our Monthly Reports, has not been very great during the last Session of the Society, and we shall therefore limit ourselves for the present to little more than an enumeration of the papers contained in the volume before us.

1. *The Croonian Lecture.—Microscopical Observations on the Suspension of the Muscular Motions of the Vibrio Tritici.*—By Francis Baner, Esq. F.R. L. and H.S. (See *Journal*, vol. V. page 97.)

2. On *Metallic Titanium.* By W. R. Wollaston, M.D. V.P.R.S. (See vol. V. page 98.) In our last volume we gave an abstract of this paper, to which the following particulars form an interesting appendix. "Since the date of this communication, the liberality of Mr. Anthony Hill, of Merthyr Tydvil, has supplied me with a larger quantity of the slag, which formed the subject of my first experiments, and has enabled me to determine the specific gravity of metallic titanium to be 5,3. For this purpose, the vitreous part was fused with a mixture of borax and subcarbonate of soda, in about equal quantities, and was then dissolved in nuriatic acid, which also removed a quantity of metallic iron, and left the titaniun freed from extraneous matter. Though great part of what was thus obtained from the interior of the slag, was in a pulverulent state, the quantity, which amounted to 32 grains, and displaced 6,04 of water, was sufficient to preclude any considerable error."

Dr. Wollaston also states, that similar metallic cubes were observed upwards of twenty years since, in a slag at the Clyde Iron Works, in Scotland; that it has been met with, in small quantities, at the Low Moor Iron Works, near Bradford, Yorkshire; and at the Pidding Iron Works, near Alfreton, Derbyshire; and that good specimens have been obtained from Pont y Pool, Monmouthshire. It does not appear, however, that any one has ascertained, or even suspected, the real nature of this singular product.

3. *On the Difference of Structure between the Human Membrana Tympani, and that of the Elephant.* By Sir Everard Holme, Bart. V.P.R.S. (See *Journal*, page 99.)

4. *Corrections applied to the Great Meridional Arc, extending from latitude* 8° 9′ 38″ 39. *to latitude* 18° 3′ 23″ 64, *to reduce it to the Parliamentary Standard.* By

Lieut. Col. W. Lambton, F.R.S. &c.* (See *Journal*, vol. V. page 157.)

5. *On the changes which have taken place in the Declination of some the principal fixed Stars.*

6. *Appendix to the preceding Paper on the changes which appear to have taken place in the Declination of some of the fixed Stars;* and

7. *On the parallax of α Lyræ.* By John Pond, Esq. Astronomer Royal, F.R.S.

8. *Observations on the Heights of Places in the Trigonometrical Survey of Great Britain, and upon the Latitude of Arbury Hill.* By B. Bevan, Esq. Communicated by Sir H. Davy, Bart. P.R.S.

By calculating the latitude of Arbury Station, from the latitude of Blenheim, as determined by previous observations, Mr. Bevan found it to be 52° 13′ 23,″ or five seconds *less* than was shown by the zenith sector.

Projected Tunnel under the Thames at Rotherhithe.

We have perused with much attention, the interesting pamphlet of Mr. Brunell, on the subject of excavating a tunnel under the bed of the river Thames at Rotherhithe; the practicability of which vast undertaking, and indeed the perfect facility of executing it, Mr. B. has fully demonstrated. We had intended to offer a few remarks on this novel plan for establishing a communication between the

* This lamented gentleman, to the incalculable loss of the sciences, and the deep regret of all who were acquainted with his worth, paid the debt of nature, on 20th of January last, in India, having fallen a victim to the intense zeal with which he attended to his important scientific duties in that country.

opposite shores of the river; but as application is to be made immediately on the meeting of the legislature, for a bill to invest the parties with the necessary powers for carrying it into effect, we shall defer our observations until that period, when the subject will come more directly under our notice, and at the same time be an object of universal attention.

London Bridge.

It has been at length determined to remove the ancient bridge of the metropolis, and to erect a new one near the present site; the plans however do not appear to have been yet perfectly matured. We shall therefore defer our observations upon the subject, until we are enabled to communicate a satisfactory account of the ultimate design, with such collateral matters, as may be likely to interest our readers.

Society of Arts.

List of Premiums for the Session 1823—1824, *continued.*

Agriculture.—For having planted, since June, 1821, the greatest number of walnut trees for timber. *The Gold Medal.* For the next greatest number, *The Silver Medal.*

The Gold Ceres Medal, or Thirty Guineas, for the best method of securing young plantations from hares, rabbits, sheep, and cattle; and from the depredations of wood-stealers.

The Gold Medal, for an improved mode of propagating the superior varieties of walnuts. The same, or *Thirty*

Guineas, for cultivating the greatest quantity of land with potatoes, of such qualities as shall be fit for the table in April, May, and June, 1825.

The Silver Medal, or Twenty Guineas, for collecting the greatest quantity of seeds from plants raised in Great Britain, of a species of poa, the stems of which are employed in the United States as the material for fine plat. *The Silver Ceres Medal, or Ten Guineas*, for the next greatest quantity.

The Silver Medal, for cultivating horse-beans, or tick-beans, which, being sown in the spring, shall ripen their seeds before August 21st. The same, for cultivating the greatest quantity of land with parsnips for feeding cattle.

The Gold Ceres Medal, for preventing the rotting of clover plants.

The Gold Medal, for cultivating the greatest quantity of land with hemp. *The Silver Medal*, for the next greatest quantity.

The Gold Medal, for preparing the greatest quantity of opium from the white poppy *(Papavier Somniferum). The Gold Ceres Medal, or Thirty Guineas*, for the next greatest quantity.

The Gold Medal, respectively for destroying the grub of the cockchafer, and the fly, on turnips, or preventing their injurious ravages; and for preventing the blight on fruit trees and culinary plants.

The Gold Medal, for the best experiments on stall-feeding cattle for twelve months; for the best mode of protecting flocks of sheep from the inclemency of the weather; and for having kept, in 1821, 1822, and 1823, the greatest number of Cachemire shawl goats.

The Gold Medal, or Fifty Guineas, for the best method of curing the rot in sheep.

The Silver Medal, or Ten Guineas, for protecting sheep from injury by flies.

Chemistry, Dyeing, and Mineralogy.—*The Gold Vulcan Medal, or Thirty Guineas,* for inventing an earthenware crucible to endure greater heat than those now in use; and for making crown or window-glass as transparent and free from blue or green colour, as the best German sheet.

The Gold Medal, or Fifty Guineas, for a method of purifying whale or seal oil from the glutinous matter that encrusts the wicks of lamps; and for a method of rendering oil more fit for chronometers and watches.

The Gold Medal, or Thirty Guineas, for making flint glass free from veins, and as dense and transparent as the best now in use; and for the best mode of preserving the seeds of plants in a state fit for vegetation.

The Gold Medal, or One Hundred Guineas, for the best substitute for the basis of white paint, equally proper as the white lead now employed. For the best substitute for Stockholm tar, equal to the best of that kind, and the produce of Great Britain, or the colonies. And for discovering, within Great Britain or Ireland, a quarry of white marble, equally fit for the purposes of statuary as that imported from Italy.

The Gold Medal, or Fifty Guineas, for a black dye for silk or wool, superior to any in use. For the best mode of staining cotton cloth with a red colour, by an immediate application of the colouring matter, and equal to the red colours now procured from decoctions of madder. The same, of a green colour, equal to the colours now formed from decoctions of weld, and solutions of indigo. For a mode of preparing a red pigment, fit for use in oil or water, and equal in tone and brilliancy to the best lake and carmine. For publishing the best mineralogical and geological

map of any county in the United Kingdom, on a scale of not less than one inch to a mile. And for publishing an accurate similar map of Ireland, on a scale of not less than five miles to an inch.

The Gold Medal, or Thirty Guineas, for a mode of dyeing silk of a pink or rose colour, without the use of safflower, by a substitute of British or colonial growth, and at two-thirds of the current expence. For an improved method of dyeing silk, wool, or cotton, with lac lake. For a white paint for oil, not liable to be discoloured by exposure to light, or to sulphuretted hydrogen gas. For an artificial ultramarine, equal to, and cheaper than, the best prepared from lapis lazuli. And for a colourless varnish, made from shell or seed lac.

Polite Arts.—To gentlemen under the age of twenty-one. *The Silver Medal* and *Silver Isis Medal* respectively for the best and second best drawing in chalk, pencil, or Indian ink, from a statue of an entire figure: for a copy of an historical subject; for a painting of the same in water-colours: for the copy of a portrait in water-colours: for the copy of a landscape in water-colours: for a copy of flowers or fruit in water-colours; and for each of the foregoing in oil-colours: for the best copy of a portrait in pencil, Indian ink, or chalk, *the Silver Isis Medal;* for the next in merit, *the Silver Palette*: the same for the best copy of a landscape.

To ladies under eighteen, the same.

To gentlemen under twenty-five. *The Gold Isis Medal,* and *The Silver Medal,* for the best and second best original paintings, in water-colours, of an historical subject; of a miniature portrait; of a landscape; of flowers or fruit; and of a portrait, a landscape, flowers or fruit, and still life, in oil: of still life in water-colours, *The Silver Medal,* and

Silver Isis Medal: and of an historical subject in oil, of not less than three figures, *the Gold Medal*, and *Gold Isis Medal.*

To ladies under twenty-five, the same.

To Artists and others: *Human Figure.* For the best copy in chalk, pencil, or Indian ink, by persons under sixteen, *the Silver Isis Medal;* for the next in merit, *The Silver Palette.*

The Silver Medal, and *Silver Isis Medal* respectively, for the best and second best outline drawing from any entire figure: the drawing not less than twenty-four inches in size, and accompanied by the drawing of a hand and foot, the size of life, by persons under eighteen: for a drawing of the same, by persons under nineteen: for an outline drawing of an entire anatomical figure on the same scale, and with the same accompaniments, by persons under nineteen: for a drawing of the same size, from the living figure, by persons under twenty-one: for a copy, in water-colours, from any picture containing not less than two figures—the size of the principal one at least nine inches, by persons under twenty-one; and for the same in oil, the principal figure not less than twenty-four inches. *The Gold Isis Medal*, and *The Silver Medal*, respectively, for the best and second best, of an original drawing, being a composition of two or more figures—the principal one not less than nine inches, by persons under twenty-five; and for the same in oil—the principal figure not less than twenty-four inches.

The Gold Medal is offered for the best original historical painting in oil, containing three or more figures—the principal one not less than twenty-four inches high; the canvass to be a common half-length, and the subject to be taken from English history previous to the reign of Charles I., by persons under twenty-five. For the next in merit *The Gold Isis Medal.*

The Gold Medallion, for the best original design of a bridge, adapted for the purposes of London Bridge, consisting of plan, &c., on the scale of 1-16th of an inch to a foot, by persons under thirty. *The Gold Isis Medal* for the next in merit.

The Gold Medallion, for the best design for a church of pure Doric architecture; the drawings on a scale of one-eighth of an inch to a foot. For the next in merit, *The Silver Medal.*

The Silver Medal for the best original drawing of the anatomy of the human body, or any part thereof, by persons under twenty-two. *The Silver Isis Medal* for the next in merit.

Manufactures.—*The Gold Medal*, or *Forty Guineas*, for a process equal to that of the French for preparing skins for fine gloves, with at least a dozen pair of gloves made from such prepared skins.

The Gold Medal, or *Thirty Guineas*, for the best method of manufacturing the intestines of sheep and other animals into cat-gut, equal to the best Italian strings.

The Gold Isis Medal, or *Thirty Guineas*, for a mode of making hose for fire-engines, brewhouses, &c., of hemp or flax, or other flexible material cheaper than leather.

The Gold Medal, or *Thirty Guineas*, for a method by which to organize silk equal to the Italian throw, at two-thirds of the expence; and the same for a machine to weave figured silks, of patterns equally rich as those made in France, at less expence, and working with greater facility.

Mechanics.—*The Gold Medal*, or *Fifty Guineas*, for a machine for raising coals, ore, &c., from mines, superior to any one now in use.

The Gold Medal, or *Thirty Guineas*, for an improved walking wheel, or crane, in which the power can be varied: for a machine to raise water from wells not less than fifty

feet deep, by a mode superior to any hitherto known: for an improved method of boring or blasting rocks in mines, &c.: for a method of heating rooms, superior to any now in use: for preventing accidents from horses falling with two wheeled carriages: for improving turnpike and other roads, by combining materials ordinarily employed, so as to form an even, hard, and durable carriage-road: for a mode of preventing the injurious effects attending the operation of pointing needles, and other branches of dry grinding; and for preventing explosion in steam-engines, and other closed boilers.

The Gold Vulcan Medal, or *Thirty Guineas*, for the best working drawings of a condensing steam-engine in its most improved state, with descriptions, &c.

COMMERCE.—*The Gold Medal*, or *Fifty Guineas*, for exporting to the continent previous to February, 1824, the greatest quantity of British cured herrings, not less than 500 barrels. *The Gold Isis Medal*, or *Thirty Guineas*, for the next greatest quantity, not less than 300 barrels.

The Gold Medal, or *Fifty Guineas*, for the best method of removing the stumps and roots of trees left in the earth after felling the timber.

Guy's and St. Thomas's Hospitals, Southwark.

The annual course of medical and scientific instruction at these hospitals will commence early in the month of October, when separate courses of lectures will be delivered on the following subjects, viz.;

Practice of Medicine; Pathology; Therapeutics and Materia Medica, by Drs. Cholmely and Back, Physicians to Guy's Hospital.

Principles and Practice of Chemistry, by William Allen,

Esq. F.R.S.; Dr. Bostock, F.R.S., and Arthur Aikin, Esq.

Experimental Philosophy, by William Allen, Esq. F.R.S. and John Millington, Esq., Prof. Mech. Phil. Roy. Inst.

Midwifery and Diseases of Women and Children; and on Physiology, by Dr. Blundell.

Anatomy and the Practice of Surgery, by Sir Astley Cooper, Bart. and Mr. Green.

Structure and diseases of the Teeth, by Mr. Thomas Bell.

Medical and Practical Botany, by Dr. Bright.

A Course of Chemical Lectures will be delivered in the Season.

Mr. Stocker, Apothecary to Guy's Hospital, enters pupils to all the above Lectures.

Composition of Morphia.—It appears from the experiments of M. Bussy, that the component parts of Morphia are

Carbon	69,0
Azote	4,5
Hydrogen	6,5
Oxygen	20,0
	100,0

Glassy Actynolite.—Mr. Seybert of the United States having analysed this substance, states that its constituents are

Silica - -	56,333
Magnesia - -	24,000
Lime - -	10,666
Carried forward	90,999

Brought forward	90,999
Protoxide of Iron -	4,300
Alumina - -	1,666
Water - -	1,033
Protoxide of Chrome, a trace.	
	97,998
Loss - -	2,002
	100,000

The loss of weight by ignition is estimated at water in this statement.

Mineral Caoutchouc.—A mine of Mineral Caoutchouc, has been recently discovered at Southbury, near New Haven, United States. It is found in a region containing slaty rocks, indicating the vicinity of coal, for which a search is now being made, and intersected by veins of fibrous limestone. Between the slate and the limestone are the veins occupied by the mineral caoutchouc. It is not very elastic, but soft, easily impressible by the nail, and unites together on compression. Its colour is jet black, and it burns with extreme brilliancy, with much dark smoke, and an odour between that of a bitumen and an aromatic; during the combustion, drops of liquid fire fall in a stream or in quick succession, and with a whizzing noise. exactly similar to the vegetable caoutchouc, and it melts precisely as that substance does. When rubbed on paper it leaves a black streak and acquires a high polish, but it does not remove pencil marks. The veins containing it are about a *quarter of an inch wide and several inches long.*

Chestnut Tree Bark.—It is stated in the *Annales de l' Industrie*, that chestnut tree bark, contains twice as much of the tannin matter as the bark of oak, and almost twice as much colouring matter as logwood. With iron it forms an intensely black and durable ink. Its colouring matter has a stronger affinity than sumach for wool, and possesses the excellent property of not being affected by air or light.

We understand that Sir Humphrey Davy has, within the last month, discovered, that the application of a certain gas, fifteen times heavier than the atmosphere, to the mechanism of a steam-engine, will produce a power fully equal to that which is now obtained by the application of steam. The great obstacle to the immediate introduction of this gas into general use, is the difficulty of confining it. The task of constructing vessels sufficiently strong and convenient for that purpose, is proposed as a problem, the solution of which, must be attended with inestimable benefit to this country.

The Atmosphere.—Professor Zimmerman of Giessen, announces that he has ascertained that all atmospheric aqueous substances, as dew, rain, hail and snow, contain meteoric iron combined with nickel. Rain also contains salt, and a new organic substance composed of hydrogen, oxygen and carbon, to which he has given the name of *pysine.*

Royal Academy of Science.

Paris.—The following prizes are offered by this Institution; to determine in the year 1825, by a series of chemi-

cal and physiological experiments, what are the phenomena which succeed one another in the digestive organs, during the act of digestion, *a Gold Medal* of 3,000 francs in value For 1824; to determine the density which liquids, and especially mercury, water, alcohol, and sulphuric ether, acquire by compression equal to the weight of several atmospheres; and to measure the quantity of heat, produced by such compression, *a Gold Medal*, of 3,000 francs in value; *a Gold Medal* of the value of 300 francs for comparing anatomically, the structure of a fish and that of a reptile. *A Gold Medal* of 895 francs in value, for the best work on experimental Physiology. *A Gold Medal* of 2000 francs in value, to the individual who shall best deserve, of the Academy, by the invention or improvement of useful agricultural, mechanical or scientific instruments. *A Gold Medal* of the value of 635 francs, for the most interesting observation or most useful treatise in furtherance of Astronomy. *A Gold Medal* of 530 francs in value for the best work published on the science of Statistics. The sciences have recently sustained an irreparable loss, by the death of M. de Lalande, the intelligent and indefatigable traveller, who returned last year from the Cape of Good Hope, and by whom the Musée de Jardin des Plants, was so much enriched.

The Wernerian Natural Historic Society of Edinburgh, has just published Vol 4th, Part 2nd, of its Memoirs The following are its contents. Sketch of the Geognosy of Part of the Coast of Northumberland—On Fossil Remains discovered at Kirkdale, Yorkshire, &c.—List of Birds in the Zetland Islands.—Illustration of the Natural Family of Plants called *Melastomaceæ.* Examination by Chemical

Re-agents of a Liquid from the Crater of a Volcano, one of the Lipari Isles—Notice of Marine Deposits on the Margin of Loch Lomond—Descriptions of the Esculent Fungi of Great Britain—On the Habits of the Hyena of Africa—An account of three Large Loadstones, one of which presented an unusual Line of Attraction—Recollections of a Journey from Kandy to Calturo, 1819—On the Falco Chrysaëtos and F. Fulvus of Authors—On the different Opinions regarding the Distinction or Identity of the Ring-tailed and Golden Eagles—On the Natural Expedients resorted to by Mark Yarwood, a Cheshire boy, to supply the want, which he has sustained from birth, of his Fore-Arms and Hands—On the Temperature of Mines.—On some of the American Animals of the Genus Felis, particularly on the Jaguar (Felis Onca)—On some Species of the *Genus Mergus*—On the *Sertularia Cuscuta* of Ellis —On the Guanaco of South America—On a reversed Species of Fusus (*Fusus retroversus*)—On a Specimen of the *Larus eburneus*, or Ivory Gull, shot in Zetland; and on the Iceland Gull—On the Formation of the Various Lead-Spars—Description of a New Species of Larus—On the Specific Character of Birds—On the Geognosy of the Criff-Fell, Kirkbear, and the Needle's Eye, Galloway;—Speculations on the Formation of Opal, Woodstone, and Diamond: these two by Professor Jameson—On the Anatomy of the Beaver, considered as an Aquatic Animal—Map of Mackenzie's River—On some Species of the *Genus Vermiculum* of Montagu—Notes in regard to Marine Shells found in the Line of the Ardrossar Canal.

On the whole we may venture to say that the contents of this volume, add largely to our stock of knowledge in Natural History.

New Patents Sealed, 1823.

To Benjamin Rotch, of Furnival's Inn, in the City of London, Esq., for his invention of an improved Fid for the upper masts of ships, and other vessels.—Sealed 21st August. Six months for inrolment.

To James Surry, of Battersea, in the County of Surrey, Miller, for his invention of a new method of applying heat for the producing steam, and for various other purposes, whereby the expence of fuel will be lessened.—Sealed 4th September. Two months for inrolment.

To William Woodman, of York Barracks, Veterinary Surgeon of the 2nd Dragoon Guards, for his invention of an improved horse's shoe, which he denominates the bevelled heeled expanding shoe.—Sealed, 11th September. Two months for inrolment.

To Bryan Donkin, of Great Surrey Street, in the County of Surrey, Engineer, for his discovery or invention of a means or process of destroying or removing the fibres from the thread, whether of flax, cotton, silk, or any other fibrous substance, composing the fabrics usually termed, lace, nett, or any other denomination of fabric, where holes or interstices are formed by such thread in any of the aforesaid fabrics.—Sealed 11th September. Two months for inrolment.

To John Hughes, of Barking, in the County of Essex, Slopseller, for his invention of certain means of securing the bodies of the dead in coffins.—Sealed 11th September. Two Months for inrolment.

To Henry Constantine Jennings, of Devonshire Street, in the Parish of St. Mary-le-bone, in the County of Middlesex, Esq. for his invention of an instrument to be affixed to the saddle-tree, by the application and use of which, inconvenience and distress to the horse may be avoided.—Sealed, 11th September. Six months for inrolment.

To James Sprigg, the elder, of Birmingham, in the County of Warwick, Fender Maker, for his invention of a certain improvement in the manufacture of grates, fenders, and fire iron rests.—Sealed 11th September. Two months for inrolment.

To Thomas Wickham, of the Town of Nottingham, Lace Manufacturer, for his invention of an improved and prepared Rice, rendered applicable for use in all cases in which Starch is applied.--Sealed, 11th September. Six months for inrolment.

To William Hase, of Saxthorpe, in the County of Norfolk, Ironfounder, for his invention of a new method of constructing mills or machines, chiefly applicable to prison discipline.—Sealed 11th September. Two months for inrolment.

D.	H.	M.	S.	
2	12	11	11	♃'s 2nd Sat. eclipsed.
2	17	28	33	♃'s 1st Sat. eclipsed.
3	13	19	0	☉ in quadrature to ♃.
3	20	30	0	Ecliptic Conjunction ● New Moon
4	11	56	50	♃'s 1st Sat. eclipsed.
4	12	19	0	☽ in conj. with ♀ long. 6s 19° 10′. Dif. dec. 2° 54′ ☽ 12° 6′ S. ♀ 13° 15° 0′ S.
5	15	34	0	☽ in conj. with ☿. long. 7s. 4° 13′. Dif. dec. 1° 14′ ☽ 17° 34′ S. ☿ 16° 20′ S.
8	0	0	0	☿ stationary. long. 7s 4° 45′.
8	4	12	11	Immersion of α ♏ behind the Moon.
8	85	32	9	Emersion of α ♏ from the Moon. At the immersion the star will be 2′ 15″ N. of Moon's centre; at the emersion it will be 30″ S. of Moon's centre.
9	14	47	19	♃'s 2nd Sat. eclipsed.
10	10	32	0	☉ in inferior conj. with ♀ long. 6s 16° 30′.
10	17	21	0	☽ in conj. with ♅. long. 9s 7° 44′ Dif. dec. 1° 2′ ☽ 24° 37′ S. ♅ 23° 35′ S.
11	13	15	10	♃'s 1st Sat. eclipsed.
11	13	54	0	☽ First quarter.
12	0	0	0	☽ in Apogee.
16	17	23	36	♃'s 2d Sat. eclipsed.
18	15	43	29	♃'s 1st Sat. eclipsed
19	9	56	0	Ecliptic opposition ☉ Full moon.
20	0	0	0	♂ in conj. with α ♌ long. 4s 26° 30′. Dif. dec. 1° 7′ ♂ 13° 57′ N. α ♌ 12° 50′ N.
20	10	11	51	♃'s 1st Sat. eclipsed.
21	8	0	0	☾ in conj. with ♄ long. 1s 23° 0′ Dif. dec. 6° 40′ ☾ 22° 37′ N. ♄ 15° 57′ N.
23	0	0	0	☿ in his ascending node, long. 6s 22° 8′
23	17	4	0	☉ enters Scorpio ♏.
24	0	0	0	☾ in Perigee.
24	18	51	0	☾ in conj. with ♃ long. 3s 11° 0′. Dif. dec. 56′ ☾ 23° 44′ N. ♃ 22° 48′ N.
25	12	30	0	♃'s 3rd Sat. will emerge from his shadow.
25	17	36	48	♃'s 1st Sat. eclipsed.
26	7	28	0	☾ in quadrature entering the last quarter.
27	12	5	9	♃'s 1st Sat. eclipsed.
28	0	0	0	♃ stat. long. 3s 12° 0′.
28	9	30	0	☾ in conj. with ♂ long. 5s 1°. Dif. dec. 4° 56′ ☾ 8° 0′ N. ♂ 12° 56′ N.
29	0	0	0	☿ stat. long. 6s 19° 15′.
31	2	6	0	☾ in conj. with ♀ long. 6s 8° 0′. Dif. dec. 6′ ☾ 7° 57′ S. ♀ 7° 51′ S.
31	21	59	0	☾ in conj. with ☿, long. 6s 20° 0′ Dif. dec. 6° 10′ ☾ 12° 10′ S. ☿ 6° 0′ S.

N.B. All the above calculations are made to mean or clock time.
The waxing moon ☽—the waning moon ☾.

METEOROLOGICAL JOURNAL, August and Sept. 1823.

1823.	Thermo.		Barometer.		Rain in inches.	1823.	Thermo.		Barometer.		Rain in inches.
	Higt.	Low.	+	—			Higt.	Low.	+	—	
Aug.			+ ,29	— ,90		Sept.					
26	66°	56	Stati	onary	,025	10	68°	32°	+,04	. .	. .
27	72	58	,18	. .	,275	11	68	43	,06	. .	. .
28	74	56	,03	—,03	. .	12	70	40	. .	—,14	. .
29	72	53	. .	—,10	. .	13	73	45	. .	—,03	. .
30	68	52	,04	. .	. .	14	73	57	. .	—,16	. .
31	67	46	,06	. .	,05	15	68	59	,33	. .	,175
Sept.						16	66	42	,13	. .	. .
1	69	43	. .	—,04	. .	17	62	49	,16	. .	. .
2	72	43	. .	—,11	. .	18	65	35	,07	. .	,125
3	68	44	,02	. .	. .	19	62	32	. .	—,09	. .
4	73	52	,02	. .	. .	20	63	45	. .	—,07	. .
5	71	48	,01	—,03	. .	21	60	41	. .	—,30	. .
6	66	45	. .	—,01	. .	22	60	40	,32	—,06	,125
7	62	40	,04	. .	. .	23	62	40	,02	. .	,15
8	64	35	,05	. .	. .	24	66	47	,09	. .	,2
9	61	33	,01	—,01	. .	25	62	46	,10	—,04	. .

The planet Saturn and its rings now present a very interesting appearance, being so posited that the rings are very much open.

Lower Edmonton. C. H. ADAMS.

LITERARY AND SCIENTIFIC NOTICES.

In the course of the month will be published, in one vol. 12mo. with plates, A Manual of Pyrotechny, or a Complete System of Recreative Fireworks, containing familiar Instructions for making Artificial Fireworks of all kinds.

Dr. Meyrick's work on Autient Armour, in three volumes, 4to. is just published. This work acquaints us with the changes in armour, *chronologically*, and contains 70 coloured and 10 outlined plates, 26 illuminated capital letters, engraved vignette and titles, with nearly 1000 pages of letter-press.

According to the estimate of M. Chas. Dupin, a French engineer, the extent of the water and gas-pipes under the pavement of the metropolis of Great Britain, is between 1000 and 1200 miles! The roads of England only are above 40,000 leagues—more than 120,000 miles—five times the circumference of the globe.

According to the most authentic accounts, the number of steam vessels employed on the rivers of the United States of America in the year 1822, were 35, the average amount of their tonnage was 7,259 tons, two of which (the Washington and Ohio) each exceeded 400 tons, and there were no less than 30 more then building, the tonnage of which amounted to 5,995 tons, one of them being 700 tons burthen.

A Life of Rossini, with an Analysis of his best works, will shortly make its appearance at Paris.

The second edition of Goodwin's New System of Shoeing Horses will speedily be published.

A new edition of Mr. Blaine's Canine Pathology is nearly ready.

Accounts from India state that an alphabet has been invented, by which the inscriptions found in the caves and on the ancient monuments of that country may be decyphered, and which, coupled with the recent discovery of the Egyptian hieroglyphics, now actively going on, will throw much light on the early history of both countries,

Mr. J. Otley is about to publish a concise description of the English Lakes and the Mountains in their vicinity, with remarks on the Mineralogy and Geology of the district.

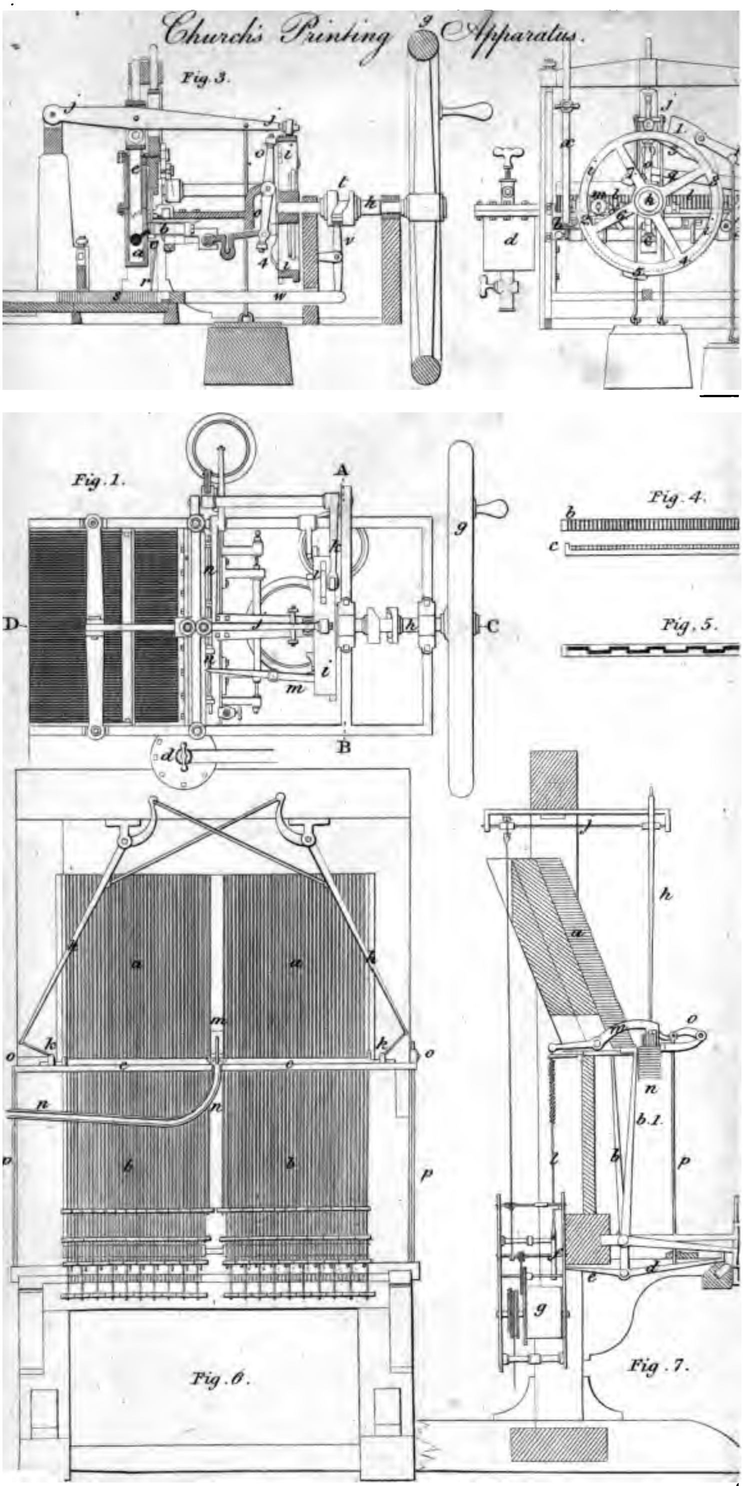
Mr. Williams has it in contemplation to publish, by subscription, Designs from a complete series of Antique Friezes, commonly known as the Phigalian Marbles, consisting of thirty-three tablets, now deposited in the British Museum.

The continuation of Mr. Booth's Analytical Dictionary is now in the press.

A Panoramic View of the City of Edinburgh has just appeared, from a drawing by Mr. Tytler.

Electricity and the Factitious Airs appear to be coming into very extensive practice as auxiliaries in the medical art. Establishments have been founded under skilful operators in several of the larger towns and cities of the kingdom, which have been productive, in very many instances, of the most salutary effects upon the human frame, in removing obstruction inaccessible to every other species of medicine. Among a great variety of instances, a remarkable one of dropsy has lately come under our notice, which, by the skilful treatment of a professional lady named Cragg, in most respectable practice at Exeter, has been perfectly cured, and the patient restored to health, after several years suffering. It is really lamentable, in these days of scientific illumination, to see many of the regular professors of medicine still adhering to the old system of quackery, and administering the same nostrums to certain complaints in all subjects, without discrimination, scarcely knowing any thing of chemistry but by name, and that almost by rote as a schoolboy. But we hope that the facilities for gaining scientific knowledge which now present themselves in every large town throughout the empire will inspire the rising generation with more expanded views, and banish from among us those prejudices, founded in ignorance, which too often incumber and impede the progress of the healing art.

LONDON:
SHACKELL AND ARROWSMITH, JOHNSON'S-COURT, FLEET-STREET.



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JOURNAL OF ARTS AND SCIENCES.

No. XXXV.

Recent Patents.

To William Church, *late of Nelson Square, Southwark, but now of the Britannia Works, Birmingham, Engineer, for an Improved Apparatus for Printing.*

[Sealed 21st March, 1822.]

In our fourth Vol., page 200, we gave notice of this ingenious apparatus, consisting principally of three pieces of mechanism; the first of which is designed to cast metallic types with great expedition, and to arrange them ready for the compositor; the second is to compose those types into words and sentences, by an operation similar to the fingering of a piano-forte; and the third, a press to produce printed impressions from the composition, in the most perfect manner, and with unexampled celerity.

Our notice of this extraordinary association of mechanism, which embraces a more extensive range of invention than we remember ever to have seen before projected by

one individual, and combined under one patent, very naturally excited public attention, and accordingly we have been re-echoed by the periodical press, in every part of the empire, but with such unwarrantable embellishments and impertinent remarks upon the subject, and its author, as would induce a belief that we were foisting upon the public, a specimen of magic, a stroke from the rod of the great and renowned MERLIN.

Feeling therefore the propriety of placing this invention in the most unequivocal light before the public, we have been induced to postpone our report, in the hope that our own observation of its practicability might obtain for it a more candid consideration, and place it, as it doubtless will be, not among the merely *curious* productions of art, but in the front rank of those valuable and useful inventions which adorn the present age. We are, however, still unable to speak of the *whole* apparatus from practical observation, as the patentee has not yet completely furnished his premises at Birmingham with such machinery as will enable him to manufacture with suitable accuracy every part of these ingenious contrivances, and our apology for thus appearing prematurely with our detailed account of the invention is, that we feel ourselves bound to report every specification enrolled during the last year before we close our present volume.

The mechanism designed for casting the types is represented by the three first figures of Plate XII. :—fig. 1, is a horizontal, or plan view of the type-founding machine. Fig. 2, is a front elevation of the same, taken at the dotted line *A B*, in fig. 1, that is the fly-wheel, and part of the frame being removed; and fig 3, is a section of the machine, cut through the middle, from front to back in the line *C D*, fig 1, the respective letters referring to the same parts in each of the three first figures.

a, is an elongated box or chest, extending across the machine (seen best in fig. 3) which holds the melted type-metal previous to its being admitted into the moulds. In front of this chest the mould for casting the types is placed. The mould is formed by a steel bar *b*, extending across the machine, in fig. 2, and detached at fig. 4. In this bar any number of perpendicular grooves are cut, for the purpose of receiving the fluid metal, for forming the bodies of the types or letters distinct from each other. Below this mould-bar the matrices *c*, are stationed, which give the letter or face of the type; and the placing and displacing of these matrices and the mould-bar, to perfect the operation of casting, which must be done with great accuracy, are the most important points which the varied motions of the mechanism have to effect; *d*, is a vessel called the fountain, to be filled with melted metal, from whence it flows into the metal-chest *a*, above-mentioned. In one of the operations of the machinery (the progressive motion of which will be explained), a plunger *e*, is made to descend into the metal-chest, and to displace a portion of the metal therein, which, being prevented from returning into the fountain, rushes with considerable force through small apertures into the respective grooves of the mould-bar and into the matrices, thereby causing a certain number of types to be cast.

The general operation of the machine is as follows: *g* is a fly-wheel actuated by hand, which gives motion to the shaft *h*. Upon this shaft the cam-wheel *i i*, is fixed, (seen best at fig. 2) and consequently turns with it. An elevated cam upon the periphery of this wheel *i*, seen at 1, is to be placed under the end of the lever *j*, previous to the commencement of the operation by which the plunger *e*, is held up. As soon as the wheel has revolved sufficiently to slide the cam 1 from under the end of the lever *j*, as in fig. 2, the plunger *e*, is instantly drawn down by a weight sus-

pended to the lever *j*, in which descent of the plunger the fluid metal is forcibly injected through the jets of the metal-chest before-mentioned, into the moulds and matrices by which the types are cast. When the wheel *i*, has revolved some distance further, an enlarged part of its periphery 2, comes in contact with the end of the lever *k*, and raises it. At the reverse end of the shaft, which carries this lever *k*, there is a short arm, which at this time shifts the mould-bar *b* laterally, and brings the grooves of the mould holding the body of the types exactly under a series of punches seen extending from the bar *l*, fig. 2. In this state of the operation it becomes necessary to unlock the matrix-bar *c*, which is done by the progress of the wheel *i*, having brought a cam 3 on the inside of the wheel to bear against the end of a lever *m*, the reverse end of which lever slides back a bar holding a series of wedges *n n*, and thereby permits the matrix-bar to descend about the eighth of an inch, so as to withdraw the ends of the cast types from these matrices.

The further progress of the wheel *i*, causes a cam 4 to strike against the upper end of the lever *o o*, the reverse end of which draws forward the matrix-bar *c*, from under the types. The types are now to be discharged from the moulds, which is done by the cam 5, (as the wheel proceeds) coming against the end of the lever *p*. This is a compound lever, the shaft to which it is affixed carrying also, at its reverse end, the arm *q*. As the arm *p*, recedes, by the pressure of the cam 5, the arm *q*, forces down the bar *l*, with its punches, which project the types out of the mould-bar, and cause them to descend into the guides *r*, fig. 3.

These guides are square tubes formed to the figure of the types, which slide down them; but in order to arrange the types all in the same direction, and deposit them in files or ranks in the box *s*, the guides are twisted one quarter round, which brings the body of each type into that posi-

tion required for placing them in the composing machine, to be explained hereafter. After the types have descended in the guides, they are severally pushed backward into the ranges of the box *s*, by means of a pair of guide-cams *t*, upon the shaft of the fly-wheel, between which cams the end of the lever *v*, acts, see fig. 3; and by the obliquity of the cams, the lever *v*, is made to vibrate and slide the type projector-bar *w*, backward and forward, so that at every operation of the machine the types are pushed backward in ranges of the box *s*, each type preserving its erect position.

The cam 5 having passed the end of the lever *p*, the weight attached to the lever causes the punch-bar and punches *l*, to rise out of the moulds and resume their former position. The cam 6, now comes in contact with the lower end of the lever *o*, and pushes it back, which causes the matrix-bar to resume its former place beneath the mould-bar, and the locking up of the matrix-bar is effected by the cam 7, coming in contact with the end of the lever *m*, which pushes back the wedges to their original situation. The next motion of the mechanism, as the wheel *i* continues its revolution, is the sliding of the mould-bar into its former position, which is done by the friction-roller at the end of the lever *k*, descending from the elevated part of the periphery of the wheel *i*, at 8, which shifts the mould-bar back, and places the grooves for the moulds over the matrices, as before. The cam-wheel *i*, having performed one entire revolution, the cam 1, is again brought under the end of the lever *j*, which raises the plunges *e*, and another operation of casting at this point commences, and proceeds as described.

The construction of the mould-bar is considered by the Patentee to be a very important feature of the invention; it has a channel, with many turnings, cut through it (as shewn by the section, fig. 5) for the passage of cold water, in order to cool the type-metal as quick as possible after

casting: this water is conveyed to the mould-bar by a pipe *x*, leading from a reservoir placed in a convenient situation, which water may be discharged at an aperture *y*, and conveyed away by a pipe.

There are several simplified modifications of this apparatus, to be worked by hand, divested of the fly-wheel and most of the levers; but these are not calculated to perform the business with equal facility, or to produce so great a number of types at one operation.

The second part of this series of apparatus for printing, is the machine by which the types are to be composed, that is, selected and associated together into words and sentences. Having disposed and arranged the several sorts of types into narrow boxes or slips, each individual slip containing a great number of types of the same letter, which is called a file of letters, the cases with these types are placed in the upper part of the composing machine, a front view of which is shewn at fig. 6, and a section of the same at fig. 7; *a a*, are the boxes or slips containing the types; *b b*, are a number of jacks, to each of which a key is connected in a manner somewhat similar to the jack and keys of a harpsichord or piano-forte. There are four rows of keys, which are so disposed for the convenience of gaining space, in order that any one of them may be touched by the finger, as at fig. 7; *c c c*, is a plate with a number of slits corresponding to the keys, through which slits the heads of the jacks pass. There are precisely the same numbers of files of letters that there are jacks, each file standing exactly over the head of its jack in front of it.

Any one of the keys being pressed upon by the finger will cause the upper part of the jack to advance, and push forward the lower type of the file against which it stood on to the front part of the plate *c*: this operation is shewn by the finger and jack *b*, 1. *b* 1. fig. 7. By the descent of

the key a bar extending along the front of the machine, and its arms *d*, will be pressed down, which raises the lever *e*. The end of this lever *e*, enters a snail-groove in a snail-wheel *f*, connected by a train to a barrel *g*, containing a spring, intended to act as a clock-movement to give motion to the arms *h h*, in front. The lever *e*, acts as a trigger, which lets off the clock-movement every time that a key is depressed, and by the end of the lever working in the snail-groove of the wheel *f*, above-mentioned, that wheel revolves only once round upon the descent of each key, being stopped by the trigger at the end of the snail-groove; consequently the movement is not continuous but intermitting, and can only start when the trigger is raised through an aperture from the larger to the smaller radius of the snail-groove.

The nature of clock-movements being well understood, it is only necessary to say that every revolution of the snail-wheel *f*, raises and depresses the connecting rod *i*, by means of the crank upon its axle; this causes the shaft *j*, which also carries the collecting arms *h*, to vibrate, and thus every revolution of the snail-wheel *f*, gives a pendulous motion to the lower ends of the collecting arms *h h*, and brings the collectors *k k*, together. It will now be seen that at the instant after the jack has pushed an individual type out of its file on to the front part of the plate *c*, the collecting arms *h h*, are actuated by the clock-movement, and by means of the collectors *k k*, slide the type from whatever part of the plate *c* it may be situate to the centre. At this precise moment of the operation the larger radius of the snail-wheel *f*, will be uppermost, and its periphery acting against a friction-roller at the bottom of the rod *l*, will raise that rod, and thereby depress the longer arm, or front part of the lever *m*, connected to it, by which means the type brought to the middle of the plate will be pushed down through an

aperture in the plate into the curved channel *n n*, which answers the purpose of a composing stick, where the types collect as the operation of the machine composes them into words or sentences, and from whence they may be taken and adjusted into lines by hand, or formed into pages, by means of a box, which may be placed on the side of the machine at the end of the channel.

A mode of adjusting a slight metallic bar on the plate *c*, for the purpose of pressing upon, and preserving the position of the type, as it slides along the plate, is suggested; it is to be raised up from the plate, or pressed down upon the type by the operation of the levers *o o*, which are worked by connecting rods *p p*, extending from the arms *d*, and consequently acting by the depression of the keys; and the winding up of the clock-work is intended to be effected by a treadle, to which a rope may be attached, extending from a pulley on the axle of the spring-barrel.

The printing press, which forms the third part of the apparatus, we are compelled to postpone till our next number.

To Franz Anton Egells, *of Britannia Terrace, City Road, Middlesex, Engineer, for an Invention of Certain Improvements on Steam Engines.*

[Sealed 9th November, 1821.]

The only feature of invention claimed by the patentee, is a mode of procuring a parallel motion, as connected with the action of the piston of a steam-engine, by which new contrivance, a main oscillating beam is rendered unnecessary, consequently an important saving of materials, and of expence in the erection is effected, and the friction of the parts considerably reduced; the whole being rendered more

compact than the mechanism of other engines, constructed to exert the same measure of power.

The specification describes every minute part of the engine erected by the patentee, but as the "peculiar feature of invention consists in the parallel motion," (indeed the invention does not appear to embrace any thing more,) we shall confine ourselves to its description. Plate XIII. fig. 7, shews this improved part of the engine, *a* is the cylinder, within which is the working-piston, shewn by dots; the steam-pipe and condensing-pipe are not represented as connected to the cylinder, being the same as are employed in ordinary engines; *b*, is the piston-rod, working through a suitable stuffing-box; *c*, is a cross beam, fixed to the top of the piston-rod, to this beam is connected the two rods *d d*, which work up and down perpendicularly with the piston between guides *e e*. At the lower ends of the rods *d d*, pivots extend, to which the vibrating bridle-frame *f f*, is attached, at *g g*. The top of this bridle-frame at *h*, being connected by a joint to the crank *i i*, gives motion to the crank and its axle or main-shaft, and the fly wheel *k*, as the piston works up and down.

The other parts of the engine, as shewn in the specification, exhibit only what the patentee considers to be a compact, eligible and convenient arrangement of the parts, but nothing new in principle is proposed, as with slight variations of position, and form, the parts are all common to other engines.

The particular advantages proposed under this patent, are a saving of metal and workmanship in the construction of a steam-engine; the convenience of being able to get at every part to perform repairs in case of its sustaining any injury; that engines of very great power may be constructed upon this plan without requiring strong buildings to contain them, as all the parts are made fast to the ground

on which the engine stands; and lastly, if employed for the purposes of navigation, where a large fly-wheel would be inconvenient, two of the engines may be combined in such a way, that their cranks may stand at right angles to each other, and thereby enable the actions of the engines to balance each other; under which circumstance, the condensor air pump, hot and cold water pumps, cisterns, &c., may occupy the middle parts between the two engines.

[*Inrolled, May*, 1822.]

To James Gladstone, *of Liverpool, Ironmonger, for a Chain of an Improved Construction.*

[Sealed 12th March, 1822.]

This chain is formed by double links of a novel kind, the appearance of which is shewn in Plate XIII. fig. 9, and following numbers. The mode of constructing these chains, and the proportions to be observed in manufacturing them, as stated by the patentee, are these:—Rods of iron being provided of a substance suited to the strength required, they are to be cut into proper lengths for welding, single links; that is, for every eighth of an inch diameter of the iron rod, five inches in length of the rod is to be apportioned; so that if the iron rod be one inch in diameter, the length proper for making the link will be forty inches. This length being turned round and welded together forms a ring, which is to be flattened or pressed in on the sides until it meets, as fig. 10. These middle parts having been brought in contact, are to be welded, and then turned round into the form shewn at fig. 11.; another similar link being provided, is then to be passed through the eyes of the former, as fig. 12.

Stays made of iron, as fig. 13, are now to be introduced in the loops, which being first set into the loop *a*, fig. 12.,

is there made fast by welding; the link is then beaten together, and the other portion of the stay welded to the loop *b*. In the same manner, a third link is passed through the eyes of the second, and a stay fixed in the loops *c*, and *d*, in the manner above described, by which operation and accession of pieces continued, a chain may be made of any length, presenting the appearance of the chain shewn at fig. 9.

[*Unrolled, September*, 1822.]

To David Loescham, *of Newman Street, Oxford Road, in the County of Middlesex, Musical Instrument Maker; and* James Allwright, *of Little Newport Street, St. Ann's, Soho, Cheesemonger, in consequence of the Communication of a Foreigner, residing Abroad, of a New or Improved Keyed Musical Instrument, comprising in itself many qualities never hitherto produced in one Instrument, and possessing those qualities in Clearness of Sound, Quality, Distinctness, Forte-piano, Delicacy of Touch, and Shake on the Keys, or Notes by Increasing to Forte, and Decreasing to Piano, at the will of the Performer.*

[Sealed 14th January, 1822.]

The instrument above alluded to is called the Terpodion, and is stated to be capable of producing sounds or notes, "by friction on wood, metal, lead, pewter, or any other hard substance." The description is so extremely obscure, and the drawings so excessively rude, that we have found the utmost difficulty in making out any thing like the construction of the instrument, and are still at a loss as to several parts of the proposed plan. Plate XIII. fig. 8, may assist the

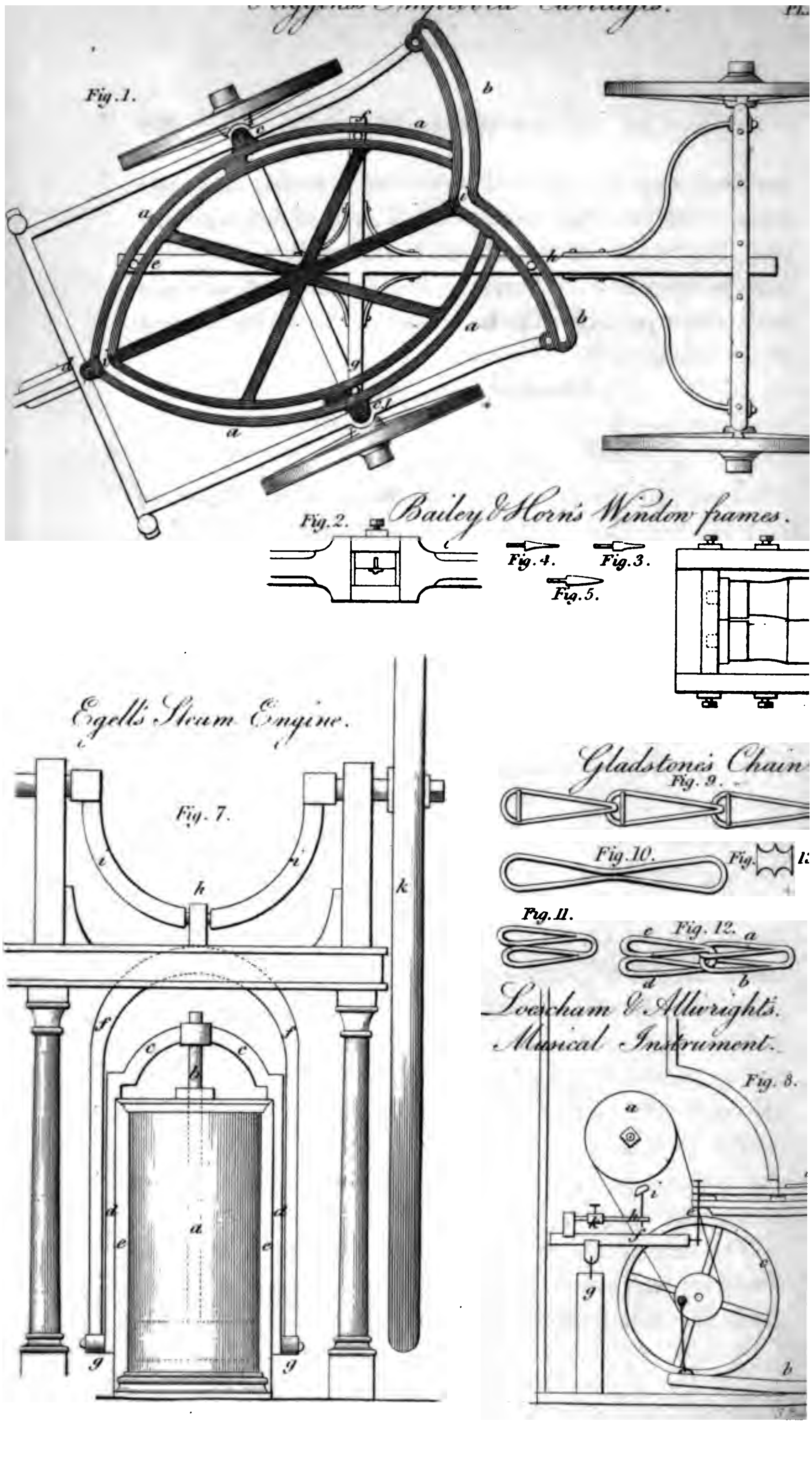


Fig. 1.
Bailey & Horn's Window frames.
Fig. 2.
Fig. 4.
Fig. 3.
Fig. 5.
Egell's Steam Engine.
Fig. 7.
Gladstone's Chain
Fig. 9.
Fig. 10.
Fig. 11.
Fig. 12.
Loecham & Allwright's.
Musical Instrument.
Fig. 8.

are formed by two pieces of metal like a tuning fork, and some of the heads *i*, are supported by a convolute spring of steel, in place of the metallic bar *h*, the length of the coiled part being greater or less, according to the grave or sharp note, which is designed to be produced by striking the key which belongs to it.

[*Inrolled, July*, 1822.]

To John Lane Higgins, *of Fulham, in the County of Middlesex, Esq. for certain Improvements in the Construction of Carriages.*

[Sealed 2nd March, 1822.]

These improvements are designed to enable four-wheeled carriages to turn within a smaller compass than those carriages of the ordinary construction which have the axletree of the fore wheels turning upon a centre pin fixed in the perch. This contrivance, called a *double centre perch*, and which has considerable ingenuity, is shewn in Plate XIII. fig. 1,; the body of the vehicle being removed, as forming no part of the invention. An elliptical frame *a a a a*, with grooves, having the tail-piece *b b*, grooved, also attached to it, is made fast to the side rails of the carriage, and fore axletree *c*, and *c*, 1, and to the drawing bar at *d*. The perch is made in the form of a cross, into which are fixed studs *e*, *f*, *g*, that act in the grooves of the elliptical frame *a*, and the stud *h*, which acts in the groove of the tail-piece *b*. These studs may have anti-friction rollers upon them, for the purpose of giving freedom to their action as they slide along the grooves.

The form of the frame and its grooves must be accurately made, the sides being segments of circles generated from the points of the grooves, near *c*, and *c* 1; the

groove of the tail-piece is formed by two segments of circles, also generated from the same points, *c*, and *c* 1, by which conformation it will be seen, that in whatever posision the fore wheels and axletree stand to the perch, whether direct or oblique, the studs will be enabled to pass freely along the grooves.

When the carriage is proceeding straight forward upon the road, the centre of the elliptical frame will be immediately over the perch, and the studs *e* and *h*, be at those points of the grooves marked *i i*, but if the draft of the horses incline to the left, the stop in the groove *a*, at *c* 1, will press against the stud *g*, and cause the right side of the carriage to advance, as in the figure, thus enabling the carriage to turn almost upon the inner wheel, as a centre. If the carriage turns to the right, the stop at *c*, will press against the stud *f*, and produce the same effect as last described, on the other side; the stud *h*, at the hinder part of the perch, sliding freely in the groove of the tail-piece to either side.

The advantages of this double centre perch, as above said, are, that the carriage may turn within a very small space of ground with perfect ease; that the improved part with the fore wheels may be detached from the perch, and employed as a gig carriage, and that the gig with the fore part may be united to the perch, and produce a curricle, or with the addition of a servant's seat behind, form a phaeton.

[*Inrolled August*, 1822.]

To Edward Elwell, *of Wednesbury Forge, in the County of Stafford, Spade and Edge Tool Maker, for his Invention of certain Improvements in the Manufacture of Spades and Shovels.*

[Sealed 20th August, 1822.]

These improvements appear to be more in the mode of manufacturing the articles than in their conformation; the Specification describes, in technical terms, the improved mode of operating, as follows: "The mould is made to be hammered or rolled into the plate, with one languet only; it is then sheared; and the front part of the copner and plate stamped into the form required, and the number of holes necessary for the rivets punched out of the front part of the copner." It is then stated, that bar or plate iron is employed for the purpose of working out the back languet, and back part of the copner, which is done, leaving the sides of a sufficient thickness. "Then raise with the stamp from the back part of the copner, the number of solid rivets required, and which also puts it into the proper form. The rivets are so arranged as to unite with the holes in the front part of the copner."

It is further stated, that "there is left from the stamp a sufficient thickness of iron on the sides of the back part of the copner as to cause it to lie close to the front part." The object of this is, to make the riveting solid, and leave the back of the shovel of an even surface. The two parts are then rivetted together, and the whole treed and finished in the ordinary way.

[*Inrolled October,* 1823.]

TO WILLIAM BAILEY, *of High Holborn, in the County of Middlesex, Ironmonger*, and THOMAS HORN, the Younger, *of Belmont Row, Birmingham, in the County of Warwick, Brass Founder, for Improvements in the Manufacture of Metallic Window Frames, and other Metallic Mouldings applicable to the ornamenting of Furniture.*

[Sealed 18th March, 1823.]

THESE inventions consist in certain additions to, and improvements on a process described in the specification of a patent, granted to the said William Bailey, by his late Majesty, and Inrolled in the High Court of Chancery, January, 1819, (see our 1st vol. page 9.) In the said Specification, the method then practised is set out, which is to take bars of iron or other metal, of a breadth and thickness suitable to the size and strength of the required window frames, and to pass these bars between grooved rollers, by which rebates and mouldings were formed upon the bars, suited to the construction of sash frames, and such other purposes as are therein described.

Now the improvements are to be considered as a continuation of that process by which such frames and other metallic mouldings are more perfectly finished, and consists in submitting the said bars, after having been rolled, to the operation called DRAWING.

The bars of metal, (brass and copper are particularly considered), are recommended to be first produced, by rolling into the form of the required bead or moulding, and after this has been effected, the said bars are to be passed through the drawing apparatus. This apparatus may be furnished with a draw plate in the usual manner, suited of course to the shape of the moulding intended to be produced upon the bar.

The particular sort of draw plate proposed to be employed, is shewn in Plate XIII. fig. 2. It consists of a pair of dies confined in a frame, which may be made fast by a screw on the top, as shewn; the upper die contains the recess, which is to dress the back part of the metallic bar, the lower die has the recess which is to dress the bead or moulding on the face of the bar, it being understood that the *form* is produced by the previous operation of rolling.

Figs. 3, 4, and 5, are sections of other formed bars, suited to the construction of window frames; these it is proposed to dress by passing the bar when formed between a pair of fixed rollers, with suitable grooves, as fig. 6; the curved surfaces of which are found to effect the object of dressing or polishing metal bars of these forms much better than the square edged dies before described.

The Patentees, in conclusion state, that their invention, and consequent claim of Patent right, is confined "to the drawing of solid bars of metal, after they have been prepared by rolling, according to the process described in the specification above mentioned."

[*Inrolled September*, 1823.]

To Jonas Hobson, *and* John Hobson, *of Mythorn Bridge, Kirkbaston, Yorkshire, Woollen Manufacturers and Merchants, for a New Series of Machinery, for the better, more effectual and expeditious Mode of Shearing, Cutting, and Finishing Woollen Cloths, Kerseymeres, and all other descriptions of Cloths and Piece Goods which require the Use of the Shears.*

[Sealed 27th July, 1822.]

This machinery consists of a frame, with a series of rollers and cutters mounted thereon, and actuated by end-

less bands, extending from a rigger upon a main axle, which is to be put in motion by a steam-engine or other first mover, for the purpose of cropping or shearing the pile from the surface of woollen cloth, and such fabrics.

Plate XIV. fig. 1, is a representation of this machinery. The frame may be of iron, bolted or screwed together at the joints; *a*, is the rigger, round which an endless cord or band passes, and over the pullies *b b*, at each end of the machine. This cord on the upper sides embraces six pullies *c c c c*, and *d d*, to each of which a crank is attached, for the purpose of moving the cutters; *e*, is the drum wheel, upon which the cloth intended to be shorn is tighty rolled. This drum is prevented from turning freely by a weighted lever, the friction of which keeps the cloth always at a proper tension. From the drum, the cloth passes over a guide roller, and thence under fixed leger-blades, situated at the bottom of the standards *f f f f f f*. Under these, elastic cushions are placed, for the purpose of pressing the cloth up against the leger-blades. As the pullies *c c c c*, and *d d*, revolve, the cranks connected to them cause the levers *g g g g g g*, to vibrate. These levers carry the moving blades or cutters of thin plate steel, which pressing against the fixed blades by the vibration of the levers, are made to cut, crop, or sheer the pile from off the surface of the cloth, in a manner exactly similar to the action of ordinary lever-shears, but adjustable by screws.

The cloth having passed under the first pair of blades, proceeds forward to be operated upon by the second, third and fourth pair, which are adjusted to cut progressively finer as it advances; and having passed the fourth pair of cutters, which is intended to finish the shearing of the face, the cloth descends over a guide-roller, and under two other guide rollers at the bottom of the machine, whence it rises, and passes under two other pairs of shears actuated by the

pullies and cranks *d d*, the object of which is to crop or shear the pile from the back surface of the cloth, or, as it is termed, the wrong side. The cloth is ultimately coiled into the drum *h*, by means of a train of toothed-wheels and pinions, impelled from the main axle, which train gives a very slow motion to the receiving-drum, thereby drawing the cloth off regularly from the drum *e*, under all the cutters.

The use of the series of blades is to finish the piece of cloth by once passing it through the machine, it is therefore provided with brushing rollers, or plush rollers, to raise the pile in the first instance, and after shearing to lay it smooth. Vibrating brushes and hard substances for rubbing the face of the cloth, are also proposed as advantageous. Instead of elastic cushions pressing on the under side of the cloth, to bear it up against the cutters, metallic rollers are proposed, which must be very accurately made; and it is proposed to lengthen these rollers by the addition of rings slipped on the axle at one end, by which they may be suited to cloths of any width, and which rings may be removed, in order to save the lists from being cut.

The particular points of invention claimed by the patentees, are the four following. First, carrying the cloth to be shorn over a series of rollers, so disposed that both sides of the cloth may be shorn by once passing it through the machinery; secondly, that the rest rollers, or solid cylindrical beds, are capable of adjustment, as to length, so as to suit any width of cloth; thirdly, by a vibrating brush, or other hard surface, the pile may be raised ready to be cropped by the cutters; fourthly, the manner of cropping the surface of the cloth by two detached blades, the moving one working at an angle against the face of the fixed one, whereby the operation is a drawn cut.

[*Inrolled, September*, 1822.]

To Samuel Pratt, *of Bond Street, in the County of Middlesex, Trunk and Camp Equipage Maker, for his Invention of certain Improved Straps or Bands, to be used for securing Luggage upon Chaises or Coaches, and for securing Property generally, when placed in exposed Situations.*

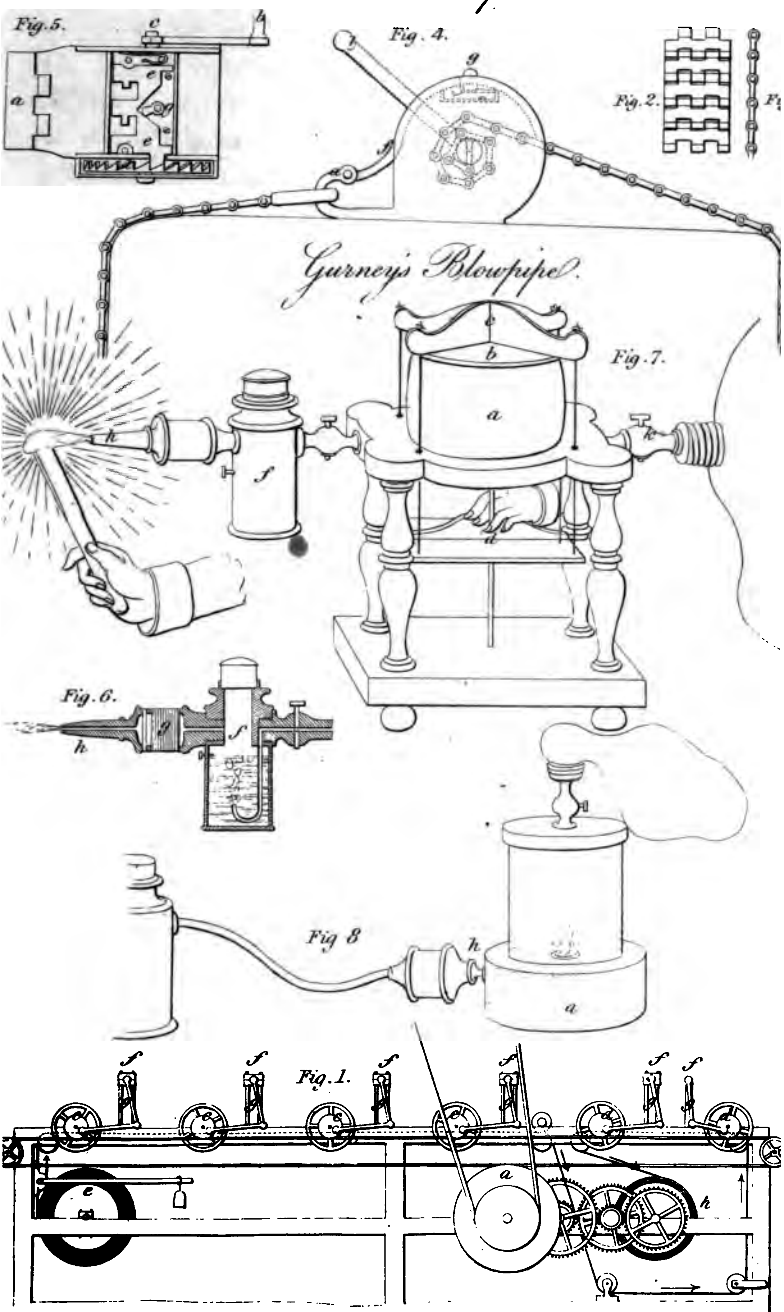
[Sealed 27th September, 1822.]

These improved straps or bands are constructed of metal chains, made flat, which are intended to pass round the luggage, wherever it may be placed, and thereby secure it to the carriage. These chains are to be attached at one end to an apparatus, called a jack, which consists of an axle, with a ratchet wheel and pall. The purpose of this jack is to coil the chain round the axle, when it is required to be shortened, or drawn tight upon the luggage; the other end of the chain being made fast by an eye to a stationary hook on the back of the jack.

The construction of the chain will be understood by the flat and side views of portions of it shewn at Plate XIV. fig. 2, and 3, being a series of joints held together by pins, in the manner of ordinary door hinges; fig. 4, shews the manner of passing this chain round the luggage, and also a section of the lock at the top. Fig. 5, is a horizontal view of the lock or bolt, on the top of the jack. The similar letters refer to the same parts of the apparatus in each of these four figures.

One end of the chain, as above said, is put over the hook *a*, and the other end is drawn up tight by the winch or handle *b*, which causes it to coil round the axle *c*, and the ratchet-wheel *d*, fixed on the end of the axle, being confined by the bolt *e e*, holds the chain fast at the point of tension

Pratt's Metallic Straps, &c.



Wilson's Shearing Machine.

to which it has been drawn. Previous to drawing the chain tight the plate *f*, is shut down, and secured by two small teeth in the bolt *e*, passing through staples on the under side of the plate.

In order to loosen the chain, a key must be introduced into the lock, on the top of the jack at *g*, which on being turned round withdraws the bolt from the ratchet-wheel, and permits the handle *b*, to be turned back, which loosens the chain and enables the luggage to be removed.

The luggage being secured by this apparatus, in any exposed situation, cannot be removed without the introduction of a key fitting the lock, or by cutting the solid part of the chain asunder. By this means a much greater security is afforded to the property of the traveller than by any other contrivance heretofore employed, since the luggage may be made fast to the carriage by the above means, without the possibility of being removed by any persons but those who have possession of the key. The form and dimensions of the different parts of the apparatus may be varied at the discretion of the manufacturer, without departing from the principle, as described above.

[*Inrolled March*, 1823.]

To John Bates, *of Bradford, Yorkshire, Machine Maker, for certain Machinery, for the purpose of Feeding Furnaces of every description, Steam-engines, and other Boilers, with Coal, Coke and Fuel of every kind.*

[Sealed 9th November, 1821.]

The machinery herein proposed consists merely in the introduction of a pair of toothed-rollers, to be turned by a band, leading from a moving part of the steam-engine, or any other first mover, which rollers are intended to crush the coal or other fuel previous to its descent on to the fire grate.

Traversing fire grates appear to be those to which the inventor purposes applying his improvement. If they are alternating,—that is, if the grate traverses backwards and forwards under the boiler,—then a pair of *cylindrical* rollers are to be employed; but if the grate be made to revolve horizontally upon a perpendicular shaft, as Brunton's, (see Vol. I., page 86, of this Journal,) then it is proposed to make the pair of feeding rollers of *conical* forms, with their smaller ends towards the centre of the grate.

A hopper is to contain the coal intended to supply the furnace, and in its lower orifice the rollers are to be placed. These rollers are made with grooves, formed round their peripheries, the elevated parts of one roller working in the recesses of the other. These elevated parts are notched or cut into teeth, by which means the coal as it descends in the hoppers is drawn down between the rollers, and crushed into such small particles as are deemed suitable for ignition, the revolutions of the two rollers being combined by a pair of toothed-wheels. The coal thus broken falls from the rollers through a suitable aperture on to the fire-grate, there being scrapers placed in proper situations to prevent its adhering to their surfaces. The size into which the pieces of coal are to be broken is to be regulated by placing the rollers farther from or nearer to each other, and the quantity supplied will depend upon the velocity with which the rollers turn. This is managed by a conical drum, placed upon the axis of one of the rollers, round which the band passes from the first mover; a sliding guide, which is drawn forward or backward according to the velocity of the engine, shifts the band from the larger to the smaller diameter of the conical drum, and vice versâ. By these means the supply of fuel will increase or decrease as the engine is working with a less or greater power of steam.

When a revolving fire-grate, (as Brunton's) is employed, it is proposed by the introduction of a circular channel of water, to prevent any air from passing from the ash pit except through the bars of the grate. This has been heretofore done by means of a rim on the circular edge of the grate descending into a chamber of sand, placed in a recess round the brickwork, by which the cold air was prevented from insinuating itself into the flues; as, however, this mode produced very considerable friction, the present patentee proposes to employ water in place of the sand, which offering little or no resistance, as the rim of the fire-grate passes through it, will produce the effect of excluding the air from the flues in a more desirable way than has heretofore been.

[*Inrolled May*, 1822.]

The revolving fire grate being already the subject of a very beneficial patent, granted, as above said, to Mr. William Brunton, of Birmingham, so lately as 1819, we are at a loss to know how the present patentee can exercise his invention; certainly he cannot until the expiration of the former patent-right, unless by licence from the original patentee.—Ed.

To William Pride, *of Uley, in the Co*[illegible] *Engineer, for his self-regulating App*[illegible] *and Warping Woollen and other W*[illegible]

[Sealed 16th May, [illegible]]

This apparatus appears to be [illegible] from the ordinary machinery [illegible] winding cotton. Its first obj[illegible] uniformly upon the spools; that i[illegible]

larly beside each other up and down the spool as the coils accumulate, and also to preserve an equal tension throughout the operation; the second is to draw off the threads from the spool on to a warp reel, in such a manner that they may be evenly disposed over its periphery.

An axle placed over the machinery carries two band-wheels of different diameters, which actuate the revolving spools by means of a band passing from one of the wheels to a small drum upon the shaft that puts the spindles in motion. The ends of the respective threads are made fast to the spools, and the band from the larger wheel made to turn the drum, the spools will then revolve with their greatest velocity, which is to be continued until the spools are about half full of thread. At that time a piece of wood, called a traveller, which has been progressively drawn forward by a cord, comes in contact with a lever, and by pressing upon it, causes the band from the larger wheel to slip out of geer, and the smaller wheel to be brought to actuate the drum, by which the rapidity of the revolution given to the spools will be diminished, and the winding consequently slower, which the increased periphery of the spools require. This is not however effected progressively, and therefore cannot answer the desired object in a very perfect manner. The sketch given in the specification, to explain the mode of shifting the band-wheels, and indeed every part of the machine, is so extremely rude, that we cannot exactly comprehend its construction, but the mode by which the spools are raised and lowered, so as to enable the threads to wind regularly up and down on their peripheries, is by a heart-wheel turning upon a shaft, actuated by a pinion and an endless screw, which heart-wheel raises and depresses a rod that guides or lifts the spools upon their spindles.

The second part of the machinery, is for the purpose of

drawing off the threads from the full spools on to the warp reel. This machine is called a *scarm*, and receives twenty spools, each turning upon a spindle. Under every spool a slight helical spring is placed, which being depressed by the weight of the thread, produces a slight degree of friction upon the spool as it turns, and thereby effects the tension of the threads as they are drawn off on to the warp-reel in proportion to the quantity of thread remaining upon each spool. The winding of the threads regularly round the circumferenee of the reel is effected by the gradual descent of the scarm, which supports the spools. It is raised level with the top of the reel, in the commencement of the operation, and nearly balanced upon pullies by pendant weights; its gravity would however carry it down, was not its descent restrained by a cord from its centre passing over guide pullies, and coiling round the axle of the reel. Thus as the reel revolves and draws off the threads, the cord coiled round its axle becomes unwound, and the scarm permitted to descend so as to deposit the warp threads regularly upon the reel as above said.

This operation being complete, the warp thread or chain, as it is technically called, is deposited upon the reel in a state of preparation ready to be taken on to the warp mill, and placed in the loom for weaving.

[*Inrolled, June,* 1822.]

To John Collinge, *of Lambeth, Surry, Engineer, for his Improvements on Hinges, which he conceives will be of Public Utility.*

[Sealed 22nd November, 1821.]

This invention is intended to supersede the pin, which generally passes through a hinge to connect the leaves together.

The improved hinge is extremely simple in its construction, and consists merely of a cup attached to one wing of the hinge, and a ball to the other. The cup of course is the lower part to receive the ball, which merely drops into it. The form of the wings in no respect affects the invention, which is limited to this peculiar mode of coupling *the cup and ball joints*, and for heavy doors which are not subject to be lifted from their seat, it is certainly a very excellent hinge, working perfectly smooth, and without the least shake. A collar of leather is introduced on the edge of the cup, or lower hemisphere, which is met by a ledge on the upper, this excludes dust or dirt from insinuating itself into the cup, and a perforation is made through the ball, from the top, in order to introduce oil, to prevent friction. This aperture is usually closed above by a short screw with an ornamental head, and a corresponding screw may be introduced through the bottom of the cup, which might pass through the aperture, and prevent the cup and ball from separating; this however is not generally employed, as the weight of the door or gate, to which the hinges may be attached, is usually such, that no fear is to be entertained of the ball jumping from its seat.

A great variety of hinges are proposed to be made upon this plan, which is applicable to every sort of hinge that opens horizontally with its axis perpendicular, but it does not appear to be calculated for hinges which open vertically, and have the axis horizontal, as its best action is with the ball resting in the cup by its own weight.

[*Inrolled May*, 1822.

Original Communications.

Northern Expedition.

The public anxiety is at length relieved from that painful apprehension which began to prevail as to the safety of our hardy adventurers. It is now our pleasing task to announce their safe return, though without the accomplishment of their leading object. The discovery of a *North West Passage* has always appeared to be a matter of curiosity more than importance, as there is but little probability of such a channel ever becoming useful to navigation or to commerce. Its discovery might have given to the philosopher some slight gleams of scientific light, but even this appears extremely doubtful; and upon the whole, the attempt can only be countenanced as the effort of a great nation to extend knowledge.

It is rather extraordinary, after the experience of former voyages, which plainly shewed that open sea was only to be expected at a distance from land, that the Expedition should be sent into a narrow channel, known to be encumbered with islands. Repulse Bay, which appears to be the spot selected for commencing the investigation, has long been known as a confined sea, having derived its name, when first discovered in 1742, from this very circumstance. While the transient summer lasted, and the sea remained navigable, the Expedition advanced to the point of 69° 48′ N. lat. and 86° W. long., which is near the shore, formerly called Prince William's Land, having many inlets, all of which were frozen: here, meeting with compact ice, that seemed to be perpetual, and finding no way open but that by which

they came, the ships retired to the southward, and finally laid up on the 8th of October, upon a small island near the coast of Southampton Isle, where they remained during the long and dreary winter.

Many amusing tales and anecdotes are told of events which occurred to different individuals of the crews; but the most striking are those which arose from an intimacy formed between the ships' company and some straggling Esquimaux, who were employed in hunting and fishing. Some of the sailors profess to have obtained a vocabulary of the Esquimaux language, and give us a sketch of their manners. It is said that they have no religious views: this is impossible, if they have minds; and indeed the accounts contradict themselves; for it is stated that they believe in the existence of a good spirit, and have the idea of a future state; and that they believe also in a demoniacal influence. These people are but thinly scattered, seldom exceeding a hundred and fifty in a hoard: are of small stature, generally inoffensive in their behaviour, and they live to a tolerable old age. Their huts are constructed with considerable ingenuity, by which the cold air is so completely excluded as to render them almost suffocating.

The dogs found in company with the Esquimaux are of the wolf character, and extremely wild. They hunt with their masters, to whom they display much of that attachment which is discoverable in the animal when more domesticated. They are considered to have been first introduced from Siberia, and are thought to possess more of the primitive character of the species than any of the dogs found in other parts of the world, all of which are said by Buffon to be variations only of the original species, changed in their external conformation from local circumstances.

In the summer of 1822, the vessels, having again got under way, cruised in the same neighbourhood which they

had visited in the preceding year; they explored several inlets, and among them one that appeared to separate all the island from the northern shore of the continent, but their progress westward was more limited than before, by impenetrable, and what was considered to be perpetual ice; they therefore came to winter moorings at the end of September, near a small island situate about five degrees eastward of the point to which they formerly penetrated, and in this situation they remained until the second week in August, of the present year, when the ice melted and the ships were again afloat. Conceiving that every attempt to penetrate through those seas, which appear to be filled with Islands, would be fruitless, thenavigators quitted the scene of their disappointed labour and returned home.

The botanical specimens produced by the voyage appear to be very few, and the flora extremely limited, the seasons of spring, summer and autumn, do not together exceed twelve weeks, all the remainder of the year is dreary winter. The thermometer appears to have sunk considerably below the point of depression observed in the former voyage, viz. 45° below zero, though the sensation of cold experienced by the crew was much less intolerable than before. The different species of wild animals found in these parts are very few, the rein deer was occasionally shot, but the musk ox was not seen. Birds were very abundant, but the flesh was unsavoury, and of a fishy flavour.

The health of the crews was greatly promoted by the hot air apparatus with which the ships were furnished, and the judicious arrangements that were made as to food, exercise and watchings. Indeed, it is surprising to hear that out of so large a company, in the course of three years only four persons died from disease, and one who was killed by accident.

These are the leading matters to be collected from the

navigator's narratives, and though many amusing anecdotes will doubtless be told, the Journal of the Expedition will scarcely be thought worthy communicating to the public, as the attempt to discover a north west passage must be considered altogether as a failure.

To the Editor of the London Journal, &c.

SIR,

SOME of the periodicals have lately spoken of Portable Gas Lamps in terms of high commendation, but the writers of these articles have certainly given vent to opinions without any practical knowledge of their subject; I therefore think it highly incumbent upon the Editors of every scientific work to state fairly to the public the *extreme danger* attendant upon PORTABLE GAS LAMPS, of the description now offered to the public, by persons calling themselves *The Portable Gas Company.* It is perhaps not generally known to the public how great an elastic power is inherent in gas, that it is capable of being compressed in strong vessels, even into a hundredth part of its volume, and that these portable gas lamps are made to contain many times their natural bulk of gas, forced in by mechanical means, which is only restrained and prevented from expanding by the strength of the copper vessel which encloses it.

It may be here said, that if the vessel is sufficiently strong, which the maker will doubtlessly be careful to provide, that no possible danger is to be apprehended. This ;s a specious argument not always realized in practice; admitting the vessel to be well made and perfectly sound, which is not always the case, the elastic force of the gas when the lamp is charged, continually pressing the vessel

outwards with very considerable power, must in the course of time tend to strain its joints, and as this continued pressure may very probably stretch the vessel, may it not absolutely weaken the cohesion of the metal?

Supposing a portable gas lamp had been carefully proved to be capable of supporting a certain force from within, which would be exerted by the compressing of a given volume of gas into the small bulk of the lamp; while this lamp was standing upon a table in the midst of a family, some accident overturned the lamp, and threw it down upon the floor with some considerable force, the pressure from within would not permit a dent to be formed in the vessel, therefore as a vibration must take place, some particles of the metal must give way, and consequently the vessel in some measure be weakened; the probability under such circumstances is, that an explosion would take place to the destruction of every person and thing within its reach.

In filling one of these portable lamps lately at the gas-works, the workmen very prudently covered the vessel to prevent danger; in the midst of the operation of forcing in the gas, the vessel exploded, and flew to pieces, broke all the windows within reach, raised the roof of the building, and alarmed the neighbourhood with an idea that the steam-boiler had burst at a neighbouring brewhouse.

As the oxy-hydrogen blow pipe of Dr. Clarke, made upon the same principle, was found to be so extremely dangerous that few persons had the boldness to trust themselves near it while in operation, and in which sometimes by sudden extinction the flame passed to the interior, and produced explosion, might not the sudden opening of a door admit a gust of wind, which should drive the flame of the gas lamp inwards and produce the same disastrous consequence? In short, it is my opinion that no person

should presume to use one of these portable gas lamps, who would not sit down coolly and deliberately before an ignited bomb shell.

I am, Sir,

Your's, &c.

PRUDENTIA.

To the Editor of the London Journal of Arts.

SIR,

IT has often occurred to me that the process of Brewing is not conducted upon the most advantageous principles, although so many treatises have been written upon that subject. I would, therefore, offer a few remarks, which appear to me deserving of consideration by every practical brewer. I shall not, at present, enlarge upon the manifest loss by evaporation, of what I conceive to be the strength and best part of the beer, by boiling away the wort for some hours, but proceed to consider another mode of deteriorating its quality, viz. by boiling the hops in the wort.

In immersing a quantity of dry hops in a copper of wort, it is obvious that a very considerable portion of the gelatinous and saccharine matter must be absorbed by the leaves, which is so extremely adhesive that no future mashing will ever extract it. Here, then, is a considerable loss of the most nutritive parts of the beer. But a still greater injury is done by boiling the hops, which effects the extraction of a nauseous and deleterious matter from the leaves and stalks of the hop, the flavour of which may be very perceptibly tasted in the beer, so much so, as to enable an experienced brewer to determine the length of time that the hops have been boiled in the wort.

In the second volume of your Journal of Arts, page 141, there are some remarks upon Dr. Ives's chemical experiments relative to hops, which should be better known. After removing a quantity of hops from a bag there usually remains an impalpable powder of a yellow colour, which had been generally mistaken for *pollen*. This powder, the Doctor states, is peculiar to the female plant, and which he calls *lupulin*. It has been discovered, that lupulin possesses a very powerful aromatic property, soluble in hot water and alcohol, but evaporating at a high temperature.

Experiments have been performed upon the hop leaves, as commonly employed in brewing, that is the hop divested of this *lupulin*, or dust, by which it has been satisfactorily ascertained, that the virtue of the hop resides exclusively in the lupulin, or dust; and that the leaves and stalks contain a nauseous matter, which, instead of adding to the bitter and aromatic flavour of the lupulin, partially neutralizes or destroys it.

Two barrels of beer were made, as the Doctor states, late in the spring, in which nine ounces of the lupulin, beaten and sifted from the hop, was substituted for five pounds of hops. The result confirmed the most sanguine expectation; for though the quantity of lupulin was less than what usually enters, accompanied with the hops, into the same quantity of wort, and the weather unusually warm, yet the beer was preserved, and possessed a peculiarly fine, pleasant, aromatic bitter.

To ascertain with more absolute certainty the preservative properties of the lupulin, equal quantities of the beer were put into two phials, and exposed unstopped to the sun. A scruple of the lupulin was introduced into one phial only; and the result was, that the beer in the phial without the lupulin turned mouldy and sour in ten days, whilst that

having the lupulin remained perfectly good at the end of fifteen.

Taking into consideration these facts, can it for a moment be doubted that the present mode of immersing the hops in the wort, and of boiling them therein, is a most injudicious mode of operating? If, instead of this process, the mashing was made with a less proportion of water to any given quantity of malt, and the deficient quantity of water employed in obtaining an infusion of the hops below the boiling point, and afterwards mix this infusion with the wort in the boiler, the effect would be, first, that no part of the gelatine or saccharine matter from the wort could be taken up by the hop-leaves; and secondly, that none of the deleterious parts of the hops would be extracted, but the beneficial part only.

From such a mode of brewing, there can remain no doubt but that beer of a superior strength and flavour would always be produced in whatever proportion the ingredients are employed; and as the operation is equally simple to the present mode of brewing, I strongly recommend it to the consideration of the public.

I am, Sir, yours, &c.

JOHN BARLEYCORN.

To the Editor of the London Journal of Arts, &c.

SIR,

I was much pleased with the letter in your last Number signed G. D. B. Whatever may be the plan he has in view for the promotion of practical knowledge in the arts and sciences, his motive is good, and I hope he will lose no time in laying it before the public. Whatever may be cal-

society, and the consequent production of useful invention, you must enlighten the minds of those whose education has been neglected—let them be grounded in philosophical principles, and the correct rules of art.

I understand that in Scotland, amongst the lower classes, and particularly amongst the artizans, there is a general thirst for knowledge; and this has been exemplified in Glasgow in an extraordinary degree by the mechanics and tradesmen, in founding an Institution for themselves, called the *Glasgow Mechanics' Institution for the Promotion of the Arts and Sciences.*

It appears that a class for instructing the mechanics and tradesmen was begun by Dr. George Berbeck, in the year 1800, while he was Lecturer in the Andersonian Institution. He began that class by giving lectures gratis, which, by his successor, has been continued, charging a small fee. This class was always considered as a distinct part of Anderson's Institution; and which from fines and donations has acquired an extensive library, and valuable museum of models, &c. Circumstances have induced this class to found an institution for themselves: and it is cheering to hear the success which has attended their endeavours. This new-modelled institution commenced in July last, by appointing a committee of management to draw up their constitution, provide a hall, library, lecturer, and apparatus. An eligible place of meeting has been obtained in a convenient part of the city of Glasgow, capable of containing 800 persons. A lecturer on Natural Philosophy and Chemistry has offered himself, and several gentlemen have come forward to contribute their gratuitous exertions in other branches of science and literature. The opening of this institution will take place on the 5th of November, with at least 700 students, mostly from among the lower orders of mechanics.

How valuable such an institution would be in London:

to instruct the lower orders of working mechanics is almost too obvious to need a comment. Certainly there is nothing in the natural constitution of Scotchmen which should stimulate them to higher views than Englishmen; yet that very class of individuals which, in London, and other great towns, idle the early part of the week in the ale-house and skittle-ground, in dog-fighting, and other brutal amusements, are, in Scotland, industriously engaged either in their ordinary labours, or recreating themselves in reading, or acquiring some species of useful knowledge. This comparison of national character, and the circumstances which have induced the difference of conduct in the lower classes of both nations, are highly deserving of public attention; and if any steps can be taken through your influence, by the circulation of your extensively useful Journal, it will confer a lasting benefit on society at large, and highly gratify,

Sir, your obliged servant,

A MECHANIC.

London, Oct. 20th, 1823.

Novel Inventions.

Perkins's Engine.

THE new engine mentioned in our last, which is designed to exhibit the power of steam when generated upon Mr. Perkins's principle, is not yet complete. We understand however that the inventor, from a series of unequivocal experiments, feels the most perfect confidence of its success-

ful operation, and we are satisfied that every exertion is making to finish it with the utmost promptitude. A very few days therefore will place the question of its advantages beyond all doubt ; but until that is decided, we shall refrain from further comment. There can be no doubt but in our next number we shall be enabled to redeem our promise, and to state fully and fairly the operating effects, resulting from a series of experiments to which the engine is to be submitted ; and as they are to be performed under the inspection of a party of scientific gentlemen, who are engaged to examine and decide upon the question of its merits, the public may rest assured that the most satisfactory decision will then be given upon the subject.

New Blue Dye.

Professor Ormstead, of the University of North Carolina, United States, has discovered that the petals of the Iris of the gardens, or blue lily, yield a dye superior to all known blues. It becomes red like turnsole, on being exposed to a stream of carbonic acid gas. It is more advantageous for dying than the blue of violets, on account of the greater quantity of colouring matter which each flower yields ; and it is said that the tint is much more beautiful. Professor O. is on the point of publishing a particular account of his interesting discovery, with a minute relation of the process of practically applying it to manufactures.

Chemical Discovery.

M. Dobereiner, Professor of Chemistry, in the University of Jena, has discovered that Platina, the heaviest of all elementary substances, when reduced into very fine particles, produces by simple contact with hydrogen gas, the

The terms on which the Government has consented to make the Experiment are said to be, the adoption of the discovery, if it answers, and indemnity for the cost attending the trial, if it does not. The success of this plan would be an era in the history of naval science. (See our fourth vol., page 179.)

New Gun.

It is stated in the French Papers, that Colonel Espinez, an eminent man of science, has invented a very curious military gun, to which a lance is attached. If the invention be perfected, it will be of great service to cavalry regiments.

Method of Whitening Linen.

The following simple process will make town-washed linen as pure and white as that washed in the Country. Where the linen cannot be exposed upon the grass, to bleach by the sun and air, let it be steeped for some time before it is washed, in a solution of oxymuriate of lime, and then boiled in an alkaline ley. Linen or cotton thus treated will not become yellow by age.

Gurney's Improved Blow-pipe.

In our Fifth vol. p. 106, in noticing Mr. Gurney's Lecture on Chemical Science at the Surrey Institution, we took occasion to mention the peculiar properties of this valuable invention, and of its very extraordinary powers, combined with its perfect safety, the construction of which instrument we promised to lay before our readers as early as circumstances would permit. We now beg to redeem our pledge,

and to devote a few pages of our Journal to the consideration of one of the most important auxiliaries to experimental science that has been presented to the philosophic world in our days.

In his lectures, Mr. Gurney informed us of the circumstances which led to the discovery of certain new theories as regarded combustion, of the uses and construction of the blow-pipe, and of the ultimate completion of his most perfect instrument. The object and use of the blow-pipe is, to increase the intensity of that most important agent, fire, and to bring it to act so forcibly upon every organic production in nature, as to decompose the most obdurate substances, and thereby to expose their properties and elementary parts. Without rehearsing the history of the blowpipe, of which much has been already said in our foregoing volumes, we shall proceed to notice the discoveries of the present inventor, taking up the subject at that point of improvement where Dr. Clarke left it, viz. a strong iron vessel, containing a condensed volume of inflammable gas, which, in the hands of the most experienced operator, frequently exploded, with the most direful consequences.

Finding that wire-gauze, which has been usually employed as a medium to separate the flame from the gas in the condensed oxy-hydrogen blow-pipe, frequently proved ineffectual, the most judicious plan was considered to be the removal of those parts of the apparatus that were most dangerous in the event of explosion, viz. the iron or copper box which held the condensed gases. A bladder or silk bag was, therefore, substituted as a gasometer, and after being filled, was subjected to a pressure, instead of the elastic force obtained in the former case by condensation. The bladder, containing the mixed gases, was placed on a table, and a piece of pasteboard put over the top, fastened by strings to a board below, upon which the pressure was

made. In the event of the bladder exploding, no other mischief occurred, than the breaking of the strings, and the ascent of the pasteboard. All apprehension of danger being thus removed, the next step was to construct a tube by which the gas might be permitted to inflame in a jet at its extremity without igniting that portion contained within the bladder. After a variety of experiments, however, it was found that, in removing the pressure from the gasometer, the flame passed through the most minute apertures, even through the pores of wood, and ignited the gas within. It was now discovered, that when the gases were very powerfully condensed, that they would not inflame at the jet; and it was concluded, that the extinction of the flame was occasioned by the mechanical force or velocity with which the gas entered the atmosphere. From this it was inferred, that a great reduction of the force caused the opposite effect, and occasioned the flame to pass through the small tubes, and inflate the gas in the bladder.

After many experiments, it ultimately appeared to the inventor, that if immediately behind the jet he could make a small chamber to contain and arrest the return of the ignited gas, that an explosion of this chamber only would take place, and preserve the gasometer. To effect this object, a chamber was formed a short distance up the jet, (See Plate XIV. Fig. 6) and immediately behind this chamber a number of pieces of wire-gauze were placed, the interstices of which, it was known, would not permit the flame to pass, while the gas was acted upon with a certain degree of pressure. The jet being thus exploded, and a mechanical force produced within the chamber upon the wire-gauze, the passage of the flame to the interior was thereby prevented, and the desired object, of perfect safety, attained.

Whatever may be the true rationale of this experiment, the effect is unquestionable; and that mechanical force, or

velocity, is capable of extinguishing a flame of gas, may be easily shewn, by pressing gas through a jet from a common bladder, and, when considerable force is exerted, the flame will go out.

These principles being modified and adapted, produced the machine shewn at Fig. 7, in which *a* is the bladder placed upon a small table, *b* is the pasteboard on its top, *c* is a light wooden cross, from which four strings extend to the board *d* below. On this board, a weight, or the hand of the operator, is to press, by which means gas will be expelled from the bladder through the tube *e* to the jet. The internal construction of this jet, and the tubes communicating, will be seen by the section, Fig. 6. The tube *e* has a stop cock, through which the gas passes down a bent pipe, and rises in bubbles through the water in the vessel *f.* On the top of this vessel, there is a cork which, in case of explosion, is blown out without mischief; the water acts as a valve, which effectually precludes the passage of the flame to the gasometer. This cork is to be removed when the water is introduced, and a small pin on the side of the vessel regulates the height of the water within. The gas passes from the vessel *f* through the wire-gauze, or perforated piece *g*, beyond which is the safety chamber, divided into two by a wire-gauze partition; and *h* is the jet, at the end of which the gas is ignited.

As the gas becomes consumed, it may be replenished in the gasometer *a*, from a bladder *i*, through the tube and stop-cock *k*. Jets of various diameters may be employed, which screw on as *h*; and a flexible tube may be attached to the water-vessel *f*, which enables the operator to direct his jet to any situation or point, where the flame may be required, with the utmost facility.

The intensity of heat produced by this blow-pipe is such, that we have seen the most obdurate and infusible sub-

stances melt before it: flints, china, tobacco-pipes, rock-chrystal, magnesia, platina, gold, steel-files, and a variety of other substances, all have submitted to its intensity of power, and in a few minutes have melted, or become glass.

Observing that in operating with the blow-pipe, the gaseous parts of chemical products generally escape into the atmosphere, by which some important results are lost, the inventor has contrived a simple apparatus, shewn at Fig. 8, which is extremely convenient as a furnace and retort: *a*, is a block of plaster of Paris, in the centre of which is a recess to contain the substance to be operated upon, and into which a jet as *h* is conducted. Over the furnace is placed a glass receiver, ground air tight. Into this glass vessel the volatile parts emitted by the combustion are received, and may be thence taken, and preserved for future examination, by the ordinary mode of immersing the vessel in water.

By means of this apparatus, Mr. Gurney has been enabled to perform many curious and interesting experiments, the results of which he proposes to communicate to the public at some future period.

Polytechnic and Scientific Intelligence.

Society of Arts.

List of Premiums for the Sessions 1823 & 1824, *concluded.*

Polite Arts.—*The Gold Isis Medal*, for the best original painting in oil, being a composition of two or more figures, by persons under twenty. *The Silver Medal* for the next in merit.

Heads, or Portraits.—The Silver Medal, for the best finished drawing of a head the size of life, from a bust, by

persons under eighteen: for the best painting in oil of a group, not less than three heads, from the antique, and on a kit-cat canvas, by persons under nineteen: for the best painting, in water-colours, of a portrait, or group of portraits, by persons under twenty-one: for the best miniature portrait, a copy, by persons under twenty; and for the best copy, in oil, of a portrait, by persons under nineteen. *The Silver Isis Medal* for the next in merit respectively.

The Silver Isis Medal, for the best copy of a head by persons under sixteen; *the Silver Palette*, for the next best. *The Gold Isis Medal*, for the best original portrait in water-colours, by persons under twenty-five; and for the same in oil, by persons under twenty-three. *The Silver Medal*, respectively, for the next in merit.

Models.—The Gold Medal, for the best coloured anatomical model of a dissected limb, or other part of the human body; and for a group, the figures not less than twenty-four inches, by persons under twenty-five years of age: *the Gold Isis Medal*, for the next best of this last. *The Silver Medal*, for a model in bas-relief, not less than twenty-four inches, from the living figure: of a bust from nature: of a bust from the antique, of a different size from the original; and of an entire antique figure, the model not less than twenty-four inches high:—all by persons under twenty-one. *The Silver Isis Medal*, respectively, for the next in merit. *The Silver Isis Medal*, for the best model in bas-relief, from any entire antique figure, or cast in plaster, by persons under eighteen: *the Silver Palette* for the next best.

Landscape.—The Gold Isis Medal, for the best original in oil, from nature, by persons under twenty-three: for the same, by persons under twenty-five; and for an original marine painting in oil, of two or more vessels, by persons of the same age. *The Silver Medal*, respectively, for the next

in merit. *The Silver Medal,* for the best drawing of a landscape from nature, by persons under twenty-one: *the Silver Isis Medal,* for the next in merit. *The Silver Isis Medal,* for the same, being a copy, by persons under eighteen: *the Silver Palette* for the next in merit.

Flowers or Fruit.—The Gold Iris Medal, and Silver Medal, for the best and second best painting in oil, from nature, by persons under twenty-five. *The Silver Medal and Silver Isis Medal,* for the same in water-colours, by persons under twenty-one. *The Silver Isis Medal, and Silver Palette,* for the best copy in water-colours, by persons under sixteen.

Animals.—The same premiums, respectively, for an original oil painting of a group of not less than three; for an original drawing; and for a copy, by persons of the same ages as the foregoing.

The Silver Medal and Silver Isis Medal, for the best and second best original painting, in oil or water-colours, of three or more subjects of still life, by persons under twenty-one.

The Gold Isis Medal, for the best design for a vignette, to be printed at the head of the Society's letters.

The Silver Medal and Silver Isis Medal, for the best and second perspective drawing of a Corinthian Capital. *The same* respectively, for a drawing from any public building, from elevations taken by actual measurement, and drawn on large elephant paper; and for a perspective drawing of machinery—all by persons under twenty-one.

The Gold Isis Medal and Silver Medal, for the best and second best historical painting in enamel, by persons under twenty-five. *The Silver Medal, and Silver Isis Medal,* for an enamel painting of a head.

The Gold Isis Medal, and Silver Medal, for the best and second best carving in wood, of a human figure, not less

than a foot high, by persons under the age of twenty-five. *The Silver Medal and Silver Isis Medal*, respectively, for a carving of an animal, not less than eight inches high, by persons under twenty-three; and of fruit and flowers, not less than nine inches, by persons under twenty-one.

The Gold Isis Medal for the best historical engraving on a wood block, not less than twelve inches by nine, and the principal figure not less than six inches high. The same for a similar engraving on metal blocks.

The Gold Isis Medal, and Silver Medal, for the best and second best original die engraving, either of a head or single figure, by persons under twenty-one. *The Gold Medal, and Gold Isis Medal*, respectively, for the same of a group, by persons under thirty; and the *Gold Medal, or Thirty Guineas*, for a method of hardening medal dies superior to any hitherto in use.

The Silver Medal, and Silver Isis Medal, for the best and second best copy engraving in intaglio of a head or single figure on cornelian, or other hard stone: for the same, being an original, *The Gold Isis Medal, and Silver Medal*. The same, respectively, being for similar engravings in cameo. *The Gold Medal, and Gold Isis Medal*, severally, for original engravings in cameo and intaglio.

Manufactures.—*The Silver Medal, or Fifteen Guineas*, for a method of preventing plain silks from being watered in the loom, without the use of a knee-roll.

The Gold Isis Medal, or Twenty Guineas, for the best substitute for the plan now used in the single-hand loom, viz. high-lashes and pass-cords.

Commerce.—*The Gold Medal, or Fifty Guineas*, for growing the greatest quantity of nutmegs, mace, cinnamon, or cloves, not less than twenty pounds weight, in the British dominions in the West Indies, or Africa. The same for destroying the insect called the *borer*, so destructive to sugar-canes. *The Gold Medal, or Thirty Guineas*, for cul-

tivating in the British West Indies, or any other British settlement, the greatest quantity of land, with kali for the purpose of making barilla: *The Silver Medal, or Fifteen Guineas*, for the next greatest quantity. *The Gold Medal, or Two Hundred Dollars*, for cultivating the greatest quantity of hemp, in Canada, Nova-Scotia, and New Brunswick. *The Gold Medal*, for importing in 1823, the greatest quantity of the same: *The Silver Medal* for the next greatest quantity. *The Gold Medal, or Fifty Guineas*, for raising, in 1823 or 1824, a substitute for hemp in any British Colony.

The Gold Medal, or Thirty Guineas, for importing, in 1824, the largest quantity of cocoa-nut oil.

The Gold Medal, for manufacturing and importing in 1825, 6, and 7, the finest specimen of olive oil, the produce of any British Colony. The same for importing the finest wine in 1824 or 1825, from the Cape of Good Hope, or parts adjacent. The same for importing the same from New South Wales; for importing the greatest quantity, not less than two tons, of Wool from New South Wales, previous to February 1824; (the Silver Medal for the next greatest quantity) for the finest sample of wool from the same place; for the greatest quantity of Cachemire wool, not less than one hundred weight: for the greatest number, not less than three females and two males, of the Cachmire Shawl Goat; for the greatest quantity of annatto, in 1823, from the East Indies and of cochineal from the East or West Indies.

The Gold Medal, or Fifty Guineas, for the best account of the process of manufacturing India paper in China, and for the best mode of diminishing human labour in the cultivation of sugar, cotton, coffee, &c.

The Gold Isis Medal, or Thirty Guineas, for importing previous to March 1824, the greatest quantity of Brutia or Levant silk, not less than five bales of a reel, not more than

75 inches in circumference; and for the greatest quantity of extract of Mimosa bark, from New South Wales.

The Gold Ceres Medal, for importing the greatest quantity of dried fruits from New South Wales.

Philosophical Transactions of the Royal Society of London, for 1823. Part I.

[Concluded from page 208.]

On some Fossil Bones discovered in Caverns in the Limestone Quarries of Oreston, by Joseph Whidbey, Esq. F.R.S. in a letter addressed to John Barrow, Esq., F. R. S.; to which is added a *Description of the Bones,* by William Clift, Conservator of the Museum of the Royal College of Surgeons.

In reference to the variety of appearances of disease or fracture in fossil bones, Mr. Clift informs us that Professor Buckland had seen in the collection of Professor Sömmering, of Munich, the scull of a very old hyæna from the caves of Gaylenreuth, in Bavaria, in which the incisor and canine teeth, with the jaw containing them, had been entirely torn away, and the occipital and parietal crest dreadfully fractured, apparently in an affray with some more powerful animal; after which a healing and partial renovation of the parts had taken place, and the animal had lived on to a mature old age, as was evident from the state of its masticating organs.

Among the bones described by Mr. Clift, are many belonging to individuals, considerably larger than the average size of animals of that genus at the present day: there is half the lower jaw and the scull of a hyæna, in particular, of twice the dimensions, in every part, of those of a hyæna of the present age.

The article is illustrated with engravings; two sketches

of the caverns accompany Mr. Whidbey's account, and five from drawings by Mr. C. are given with his description of the bones.

On the Chinese Year, by J. F. Davis, Esq.

The Chinese year is a lunar year, consisting of twelve months, of twenty-nine and thirty days alternately, with the intercolation of a thirteenth month seven times in nineteen years, to make it correspond more nearly with the sun's course.

Experiments for ascertaining the Velocity of Sound at Madras, in the East Indies, by John Goldingham, F. R. S.

On the double Organs of Generation of the Lamprey, the Conger and Common Eel, the Barnacle, and Earth Worm, which Impregnate themselves; though the last, from Copulating, appear mutually to Impregnate one another. By Sir Everard Home, Bart., V. P., R. S.

The mean result of the Meteorological Journal, kept at the Society's Apartments, for 1822, are as follow: Height of the Barometer 29·863 inches; Six's Thermometer 55°; Rain 18·068 inches.

Calculus of Cystic Oxide.—M. Lassaigne has recently analyzed a calculus, or stone, extracted from the bladder of a dog. It weighed about 38 grains troy, and consisted of

Cystic Oxide	97,5
Phosphate and Oxalate of Lime	2,5
	100.0

By a subsequent analysis, by means of ignition with peroxide of copper, M. Lassaigne has ascertained that cystic oxide is composed of

Carbon	36,2
Nitrogen	34,0
Oxygen	17,0
Hydrogen . . .	12,8
	100.0

Inflammation of Gunpowder by slaking Lime.—To determine whether the heat generated, during the slaking of lime, was sufficient to fire gunpowder, a small quantity was put into a glass tube closed at one end, and the tube was then placed in the lime. Some minutes elapsed without any other effect than the volatilization of some of the sulphur of the powder; and it seemed as if combustion could not take place; but soon after, a loud explosion ensued, without, however, breaking the tube.

Dr. Göbel, of Jena, has recently been pursuing a course of Experiments in Chemistry, which promise to add very considerably to our stock of knowledge in that important branch of science. We give the following results of two analyses:—

Yellow Lead Ore consists of

Oxide of lead	58.1
Molybdic acid	41.8
	99.9

Tartarus Stibiatus consists of

Protoxide of antimony	42.6	
Tartaric acid	45.0	
Potassa	9.8	
Water	5.750	15

On the Alloy of certain Metals with Cast-Steel.

M. Fischer, Lieutenant Col. of Artillery at Schaffhouse, states, that when bar-iron, steel, and particularly grey cast-iron, surrounded by a great deal of carbon are exposed to a violent fire for several hours, there is formed on the surface of the fluid metal a kind of graphite or carbureted iron, which appears in very thin scales, brilliant like oligist iron, but soft, and capable of marking paper, like pencils. Their form is very irregular.

The author took an ounce of this artificial graphite, and an equal weight of pure alumine pulverized, and exposed this mixture, in a well luted crucible, for half an hour, to a degree of heat strong enough to melt maleable iron, which answers to about 160° of Wedgewood's pyrometer. After having removed the crucible out of the furnace, and suffered it to cool, a regulus or button was found in the bottom weighing exactly half an ounce, and the fracture of which was granular, of a silvery-white inclining to yellow. The residue was a black powder, weighing likewise half an ounce exactly, and giving off a strong smell of sulphur.

The author melted this regulus again in another well luted crucible, with five ounces of cast steel. The mixture being very liquid, instead of running it into an ingot mould, M. Fischer contented himself with laying the crucible in an horizontal position, or taking it out of the furnace, the covering being sufficiently luted to prevent the liquid metal form running out, which on cooling took the lengthened form, resulting from the situation of the crucible. When the whole was become cold, he broke the cruicible, and found the ingot crystallised at its surface in rays diverging from various centres, an impression of which had been taken by the scoria which covered it. The upper surface of this scoria was as it were silvered, or rather covered with a metallic varnish, resembling the coating of pottery made with platina.

The fracture of this ingot, which weighed exactly five ounces and a quarter, was found highly crystallised in vertical laminæ, some brilliant, some dull. This ingot yielded to the hammer without breaking, but exhibiting extraordinary resistance and hardness. After having been drawn out into a bar eleven inches long, heated only to a brown red, and afterwards hardened, the grain became so fine

that it could no longer be distinguished by the naked eye. The fracture was greyish white, resembling that of porcelain. The hardness which this bar had acquired by tempering was surprising: it scratched the best tempered steel, and resisted the action of a very good graver. The polished surface was damasked very speedily when exposed to the action of dilute sulphuric acid; but nitric acid gave it a deep dull grey colour.

Some penknives made of this steel preserved for a long time the sharpest edge.

The author has likewise attempted to form the alloy of steel and silver in the large way, according to the process of Mr. Farraday. For this purpose he filled two crucibles, each with twenty-five pounds of cast-steel. Presuming that all or a part of the silver to be added, was liable to be volatilized by the powerful heat, he put it together with the steel in one of the crucibles only. For the other he waited the complete fusion, and then threw the silver upon the liquid steel, into which it fell immediately on account of the excess of its specific gravity. The mixture was stirred with an iron bar covered with a thin coat of refractory earth, and afterwards run into an ingot mould. The crucible into which the two metals were put before fusion, was allowed to cool in the furnace.

After having drawn out these two masses by hammering, there was not the smallest difference found between them; and what is very remarkable is, that the alloy welded very readily.

New Patents Sealed, 1823.

To John Christie, of Mark Lane, in the city of London, merchant, and Thomas Harpur, of Tamworth, in the county of Stafford, merchant, for their invention of an improved method of combining and using fuel in stoves, furnaces, boilers, and steam engines.—Sealed 9th October—2 months.

To Joseph Rogerson Cotter, of Castle Magnor, near Mallow, in the county of Cork, for his invention of certain improvements on wind musical instruments.—Sealed 9th October.—6 months.

To John Henfrey, of Little Henry Street, Waterloo

Road, in the county of Surrey, engineer, and Augustus Applegath, of Duke Street, Stamford Street, Blackfriars, in the county of Surrey, printer, for their invention of certain machinery for casting types.—Sealed 9th October—4 months.

To Edward Schmidt Swaine, of Bucklersbury, in the city of London, in consequence of a communication made to him, by Frederick Adolphus Augustus Streeve, of the city of Dresden, doctor of physic, and Edward Swaine, of the city of Leipzig, merchant, (on whose behalf he is soliciting a patent,) for an invention of a method of producing and preserving artificial mineral waters, and for machinery to effect the same.--Sealed 9th October—6 months.

Sir William Congreve, of Cecil Street, Strand, in the county of Middlesex, baronet, for his invention of various improvements in fire works.—Sealed 16th October—6 months.

To Archibald Buchanan, of Catherine Cotton Works, one of the partners of the house of James Finlay and Co. merchants, in Glasgow, for his invention of an improvement in the construction of weaving looms, impelled by machinery, whereby a greater quantity of cotton may be woven in a given time, without injury to the fabric, than by any application of power for that purpose heretofore employed. —Sealed 16th October—2 months.

NOTICE.

We have always felt pleasure in lending our aid to the dissemination of useful knowledge, and should not object to the occasional extracting of interesting articles from our Journal into other periodicals if quoted; but the system of wholesale piracy, which appears to have commenced against us, can no longer be indured, and we have been under the painful necessity of instituting actions at law, against no less than three distinct parties. We hope that this notice will be sufficient to prevent the recurrence of such unhandsome conduct in future. The compilation of our Journal is not a work of ordinary labour and expence, and we are surely entitled to the profits of our exertions !

D.	H.	M.	S.	
1	0	0	0	♀ stationary. long. 6s 8° 49'.
1	13	31	39	♃'s 3rd Sat. eclipsed.
1	16	29	8	♃'s 3rd Sat. will emerge.
2	9	56	0	Ecliptic conjunction ● New Moon.
3	11	54	8	♃'s 2nd Sat. eclipsed.
3	13	58	29	♃'s 1st Sat. eclipsed.
4	0	0	0	☿ at his greatest elongation.
4	13	18	0	☽ in conj. with α ♏ long 8s 7° 0' Dif. dec. 1° 2' ☽ 25° 0' S. α ♏ 26° 2' S.
7	3	16	0	☽ in conj. with ♅. long. 9s 8° 40' Dif. dec. 43' ☽ 24° 15' S. ♅ 23° 32' S.
8	17	29	43	♃'s 3rd Sat. eclipsed.
9	0	0	0	☽ in Apogee.
10	10	36	0	☽ First quarter.
10	14	39	45	♃'s 2d Sat. eclipsed.
10	15	51	51	♃'s 1st Sat. eclipsed.
12	10	20	12	♃'s 1st Sat. eclipsed
13	1	14	0	☉ in opposition to ♄.
16	0	0	0	♀ in her ascending node.
17	13	9	0	☽ in conj. with ♄ long. 1s 20° 0' Dif. dec. 6° 26' ☽ 21° 50' N. ♄ 15° 24' N.
17	17	7	29	♃'s 2nd Sat. eclipsed.
17	17	45	16	♃'s 1st Sat. eclipsed.
17	22	6	0	Ecliptic opposition ○ Full moon.
19	12	13	38	♃'s 1st Sat. eclipsed.
20	0	0	0	☾ in Perigee.
21	0	13	0	☾ in conj. with ♃ long. 3s 9° 57'. Dif. dec. 1° 2' ☾ 23° 58' N. ♃ 22° 56' N
21	13	46	0	☉ in opposition to Ceres.
22	13	31	0	☉ enters Sagittarius.
24	15	20	0	☾ in quadrature entering the last quarter.
25	0	0	0	♀ illuminated 4 dig. on her western edge app. diam. 34"
25	17	37	0	☾ in conj. with ☿. long. 7s. 23° 0'. Dif. dec. 17° 0' ☾ 1° 0' S. ☿ 18° 0' S.
26	8	12	58	♃'s 4th Sat. eclipsed.
26	8	49	42	♃'s 4th Sat. will emerge from his shadow.
26	14	7	9	♃'s Sat. eclipsed.
28	6	33	0	☾ in conj. with ♀ long. 6s 21° 0'. Dif. dec. 6° 15' ☾ 13° 5' S. ♀ 7° 0' S.
30	0	0	0	☿ in conj. with β ♏ long 8s 0° 23'. Dif. dec. 51' ☿ 20° 11' S. β ♏ 19° 20' S.
30	8	26	43	♃'s 3rd Sat. will emerge from his shadow.

N.B. All the above calculations are made to mean or clock time.
The waxing moon ☽—the waning moon ☾.

METEOROLOGICAL JOURNAL, SEPT. AND OCT. 1823.

1823.	Thermo.		Barometer.		Rain in inches.	1823.	Thermo.		Barometer.		Rain in inches.
	Higt.	Low.	+	—			Higt.	Low.	+	—	
Sept.						Oct.					
26	55°	42	29,78	29,72	. .	10	50°	31°	29,38	—,30	,125
27	65	40	+ ,80	— ,79	. .	11	52	31	+,09	28,92	,225
28	56	29	,79	—,71	. .	12	50	33	,26	—,08	,2
29	59	31	,90	— ,76	. .	13	52	40	,24	—,19	. .
30	51	30	,24	— ,23	. .	14	50	30	,40	—,25	,075
Oct.						15	56	35	,38	—,34	. .
1	50	40	,05	28,73	,325	16	50	35	,53	—,47	. .
2	56	30	,50	29,26	,175	17	46	35	,55	—,50	. .
3	58	28	,79	— ,74	. .	18	56	36	,42	—,39	. .
4	54	40	30,03	—,89	, 3	19	60	39	,69	—,56	. .
5	60	41	. .	—,91	. .	20	60	50	,97	—,73	. .
6	59	52	29,83	—,77	. .	21	59	52	30,12	30,10	. .
7	57	42	+,90	—,83	,125	22	57	49	+ ,09	—,02	. .
8	58	35	,97	—,84	. .	23	59	40	29,96	29,89	. .
9	50	42	,50	—,47	,75	24	56	37	30,05	—,90	. .
						25	49	34	+ ,27	30,15	. .
						26	50	34	,29	—,20	. .

On the 22d of October, from 7 till 8 o'clock in the evening, two fine Paraselenæ (mock moons) were formed, one to the east and one to the west of the moon, the apex of the westerly one was distant from the base of the cone about 4 degrees, which is unusually great. The prismatic colours were faint.

Lower Edmonton. C. H. ADAMS.

LITERARY AND SCIENTIFIC NOTICES.

Mr. Shaw, author of the Manual of Anatomy, is about to publish a work on the distortions and deformities to which the human body is subject.

Mr. Cottle, of Bristol, will shortly publish Observations on the Preston Caves, and the animal remains contained therein.

The first number of a Quarterly Zoological Journal will appear on the 1st of January next. It will be edited by Thomas Bell, Esq. F.L.S.; John George Children, Esq. F.R. and L.S.; James De Carle Sowerby, Esq. F.L.S. and G. R. Sowerby, F.L.S.

The celebrated Danish philologer, Rask, has made a most valuable addition to the literary treasures of the University of Copenhagen, in a collection of one hundred and thirteen manuscripts in various oriental languages, and of great antiquity.

Some very rich mines of zinc and lead, mingled with silver, have recently been discovered in France, in the Departments of the Charente and the Deux Sevres. Several eminent capitalists propose to work them on a grand scale.

A remarkable meteor was observed at Keil in Denmark, about ten o'clock at night, on May 23. It was seen almost at the same time at Copenhagen, which is sixty miles from Keil.

Sir J. E. Smith, President of the Linnæan Society, has nearly ready for publication, the first portion of his English Flora.

Capt. Cruise has just published his Journal of a Ten Month's Residence in New Zealand, which contains much curious and interesting information relative to those islands.

The eighth volume of the Annual Biography and Obituary will be published on January 1, 1824.

Mr. Brayley announces the Natural History of Meteorolites.

An Institute for the study of the Oriental Languages has been lately created in Russia.

Ossified remains, supposed to be those of the quadruped called the Mammoth, have recently been discovered in a clayey soil on the banks of the Neckar, at Stutgard in Germany.

An ancient earthen pot, containing about four thousand Roman medals in bronze, of the Roman Emperors of the third century, was lately turned up by the ploughshare in the department of Aube, France.

Mr. Gurney has just published his interesting course of Lectures on Chemical Science as delivered at the Surrey Institution, and noticed by us in our fifth vol. page 106. There are some very novel experiments and extraordinary results detailed in these lectures as respects the theories of crystallization and combustion, particularly on the prismatic phenomena of flame and the variable intensities of heat observable at the different points of colour. We shall endeavour to appropriate a few pages to the consideration of these lectures in our next.

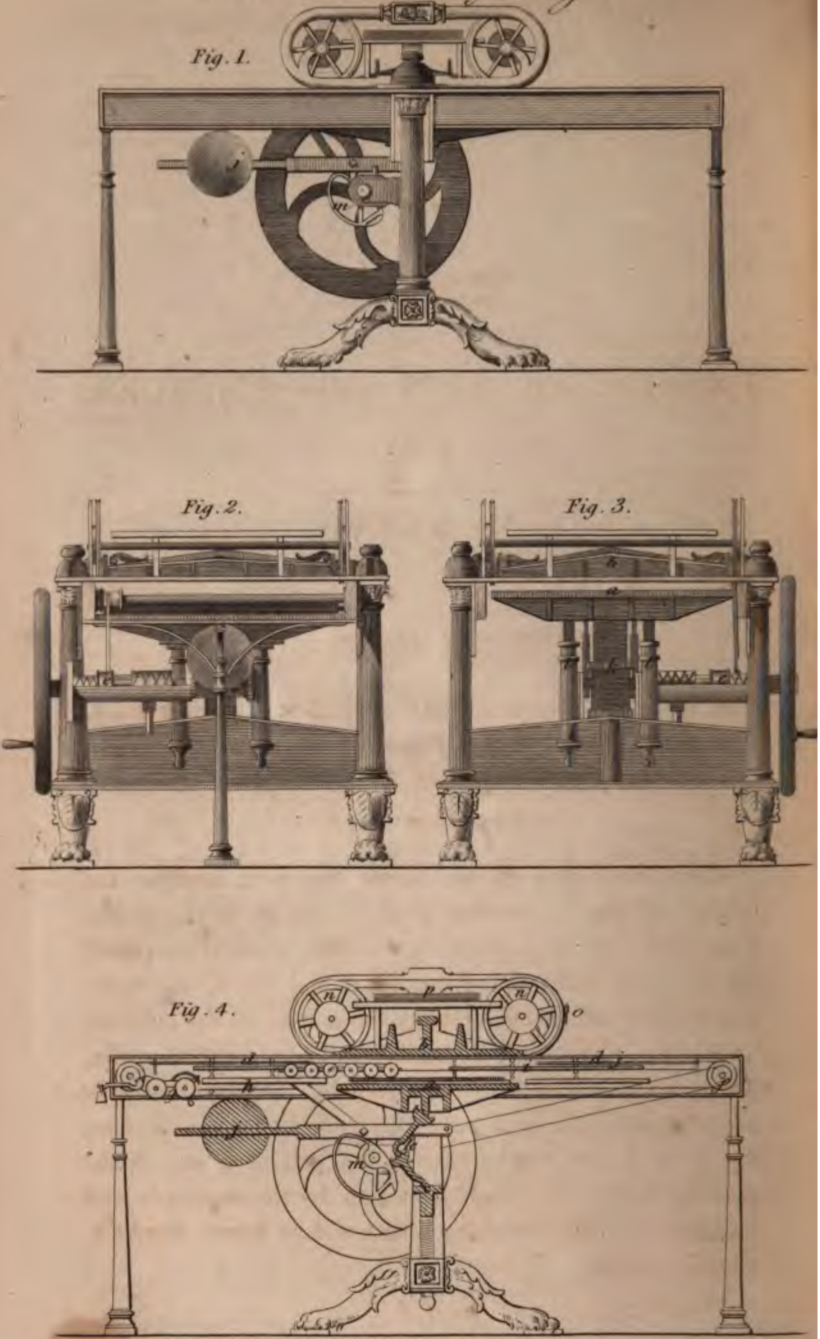
A small work called Chemical Recreations, with many plates, has just appeared; it is addressed to the mechanical class of the Andersonian Institution of Glasgow, by one of its members. There is little novelty to be expected in a work of this nature, but it appears to possess a very respectable share of merit, and to be exceedingly well calculated to initiate the juvenile student in that comprehensive and beautiful science.

A French and English Dictionary is now in the press from the pen of a gentleman named Katte. Its plan is rather novel, and is designed to facilitate the attainment of the idioms of the French language.

LONDON:
SHACKELL AND ARROWSMITH, JOHNSON'S-COURT, FLEET-STREET.

Church's Printing Press.

PLATE



C. Newton del.[t]

S. Bellin sculp.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. XXXVI.

Recent Patents.

To William Church, *late of Nelson Square, Southwark, but now of the Britannia Works, Birmingham, Engineer, for an Improved Apparatus for Printing.*

(Continued from page 232.)

The third part of the apparatus, is a machine for taking off the impressions of the types on to the sheets. Plate XV., fig. 1, is a side view of the machine or press; fig. 2, is the left end of the same, and fig. 3, the right. Fig. 4, is a section cut through the middle of the machine lengthwise, shewing the positions of the several parts, which are referred to respectively by the same letter in every figure, but seen more particularly in the section, fig. 4; *a*, is the table to receive the form of types; *b*, the platten, firmly fixed and supported by the standards and framework; *c*, are the inking rollers and its frame; *d* and *d* 1, are the friskets.

The machinery is put in motion by means of a handle and fly-wheel, upon the axle of which, are the pullies *e*; from thence cords coiled in opposite directions, pass to the pully *f*, and from *f*, an endless chain extends to a pulley at the reverse end of the machine. This endless chain is attached to the frame of the inking-rollers *c*, which are drawn backward and forward over the table and form of types *a*, by the endless chain actuated by alternating revolutions of the pullies *e*. Upon the axle of these pullies there is a peculiarly formed endless screw, with a cross thread, into which a tooth works on the under side, and by that means causes the screw to slide backward and forward in a lateral direction, which locks ultimately into one of the pullies *e*, and thereby effects the direct or retrograde movement of the inking-roller. The supply of ink is taken up from the ductor *g*, at every return of the rollers, and the uniform spreading of the ink upon their peripheries is produced by the distributing table *h*, which has a lateral sliding motion.

The operation of printing begins thus: the fly-wheel having caused the inking rollers to pass over the distributing table, and over the form of types, so as to ink them in the manner above described, the roller frame when near the end of its race strikes against a slider *i*, which instantly brings forward with an accelerated velocity the frisket *d*, carrying the sheet of paper. This stops in the centre of the machine, over the table and form, and under the platten, where it remains stationary, ready to receive the pinch of the press, in the manner about to be described.

The table carrying the form, and balanced by an arm and weight *j*, is made to rise and fall by means of jointed pieces *k*, and is guided by the cylindrical sliders working in sockets *l l*. The fly-wheel in a certain part of its revolution strikes a small lever, which locks the cam *m*, to the

shaft of the fly-wheel, and causes the cam to pass round with it. The longer diameter of this cam, now pressing against the jointed pieces *k*, brings them almost into a perpendicular position, by which effort to straighten the joint, the table is raised up with great power against the underside of the platten, and the impression given from the form of types to the sheet of paper. By the further rotation of the cam, the jointed pieces *k*, fall back to their former position, and the table descends.

In order to take off the sheet after it has been printed, one of the chaps of a pair of broad nippers is introduced under the edge of the paper, in the following manner. The wheels *n n*, are made to revolve, by means of cords coiled round them, and which are actuated by the pulley *f*, when the roller frame *c*, advances: by these cords the nippers *o*, are carried, and, previous to the impression which has been given to the sheet as above, they are brought into a situation ready to take hold of the edges of the paper, and this is done by the table and platten pressing them together at the time the impression is given. As the roller frame *c*, returns to ink the form, the nippers draw off the sheet, and by pressing against an inclined plane, the chaps open, and deposit it upon the heap, at *p*, from whence any number of the sheets may be removed by hand.

The inking rollers, having on their return passed over the face of the types, and inked them ready for another impression, and the frisket *d*, having by that means been withdrawn, the second sheet of paper is placed upon the frisket *d* 1, which is brought over the table, and under the platten by the farther progress of the inking-frame exactly as above described; at this time the reverse end of the nippers with their chaps open, are brought into a situation ready to clasp the edge of the sheet now upon the table. The revolution of the fly-wheel produces the impression as

before, and the drawing off the sheet on to the heap is performed in a similar manner. Thus the machine is calculated to print alternately sheets laid on at either end, and to deliver them on to the heap above the platten.

The velocity with which the operation of printing may be performed by this apparatus, is stated to be about forty sheets per minute; we shall however take an early opportunity of stating from observation the actual work performed by this press, as several of them are expected to be in operation in London within a short time.

In order to produce a correct register, points are fixed to the friskets, in a similar manner to the register points in ordinary printing. These points advance with the friskets under the platten, and enter small holes in the tympan when pressed. On the under side of the friskets, there are small wedge-formed pieces which drop into corresponding recesses in the table, by which means the friskets are compelled always to settle in one particular part of the table, and by that means a perfect coincidence of register is effected.

To prevent the press from closing by the too rapid velocity of the fly-wheel, before the pressman has accurately placed his sheet, there is a contrivance attached to the fly-wheel for throwing the mechanism out of geer. This is effected by means of a pendant rod hanging against the side of the upper rail, which is attached to a short lever or catch, that drops into one of several notches, or a ratchet on the axle of the fly-wheel. The pressman has therefore to touch the pendant rod when he has adjusted his sheet, which immediately connects the mechanism to the motion of the fly-wheel, but until that is done, the wheel revolves without moving the other parts of the mechanism.

In order that the form of types may be conveniently

placed upon the table, previous to commencing the operation, the platten is made to slide from over the table, and on being re-placed is fixed by the head screws firmly to the standard pillars.

Another modification of this apparatus is proposed, in which the pressure is given by drawing the platten down, instead of raising the table up, which has some similarity to the printing press invented by the same patentee, and described in our 3rd vol, page 57.

After the form of types have been used, and the desired number of impressions taken, instead of distributing the types in the ordinary way, they are to be put into the melting pot, and re-cast by the apparatus first described, by which all the types of one letter will be ranged in files, as before described, and placed ready to be operated upon by the composing machine.

[*Inrolled September,* 1822.]

To Francis Gybbon Spilsbury, *of Walsall, in the County of Stafford, for certain Improvements in Tanning.*

[Sealed 22nd April, 1823.]

The improvements herein proposed, are designed to facilitate the process of tanning skins or hides, and which differs from the ordinary operation, only by the employment of pressure, whereby the liquid tanning material is forced into, and through the pores of the skin [illegible] ad of being taken up by absorption as in the old [illegible]

The usual method pursued by tanners ([illegible] hairs have been cleaned from the skins), is to [illegible] them in troughs or pits containing an infusion [illegible] water; but as the animal fibre on the [illegible] first

takes up the tanning matter, the infusion becomes weakened and the bark spent, before the whole substance of the skin is fully acted upon, and the water absorbed prevents the access of an additional portion of bark to the interior: by which means the operation is very considerably protracted, and the substance of the skin but imperfectly and unequally acted upon by the tanning material.

The means proposed by the patentee to avoid these difficulties, and to expedite the process of tanning, are the following: the skins or hides having been cleansed from their hairs, and otherwise prepared, by any of the known convenient methods, are to be carefully examined as to their soundness, and holes, if any appear, securely closed by sewing, so as to be water tight. Three frames of wood or other materials, are then produced of equal dimensions, fitting to each other, as *a b c*, in Plate XVI. fig. 3, which shews the edge view of these frames held together by screw-bolts, and fig. 4, the side view of the same. Iron frames are objectionable, unless they be thickly coated with paint or tinned, as iron would have a tendency to blacken the skins in the progress of the tanning operation. A skin about to be tanned, is now laid on the frame *a*, and stretched over its edges, when the second frame *b*, is to be placed upon it, so that the edges of the two frames may press the skin all round, and hold it securely; another skin intended to be tanned is then stretched over the upper surface of the second frame *b*, in a similar manner to the first, and a third frame *c*, being placed upon this, confines the second skin. The three frames holding the two skins, as described, are then pinched tightly together by a series of screw bolts, passing through ears, set round their outer edges, which fixes the skin in a proper manner, ready to be operated upon by the tanning liquid.

It will be now perceived, that a space is formed between

the two skins into which, when the frames are placed in an upright position, the tanning liquor is introduced by means of the pipe *d*, from the vat or cistern *e* above, and the air permitted to escape by the stop-cock *f*, which must be closed when the bag formed by the skin is filled with the tanning liquor. The stop-cock of the pipe *d*, remaining open, a communication is kept up with the cistern above, which permits the weight of the liquor in the cistern to act upon that contained between the skins, by means of which hydrostatic pressure the tanning liquor is forced into the pores of the skins or hides, and ultimately filtered through them; the tanning matter having in its progress been taken up by the animal fibre, and the operation of tanning the skins perfectly effected in a very rapid manner.

The hydrostatic pressure will of course be increased or diminished, according to the quantity in the cistern, and may be varied by means well known, as circumstances shall require, and the filtration will appear as dew, or in small drops, on the outer surface of the skins.

When the skins have become sufficiently tanned, the stop-cock *d*, is closed, and the liquor drawn off by the cock *g*; the frames are then removed, the bolts loosened, and the outer edges of the skins pared off as far as they have been pinched by the frames; after which, the skins are to be dried and finished in the usual manner.

The time required to effect this tanning process, will of course depend upon the substance of the skins operated upon, the strength of the tanning liquor, and the weight of hydrostatic pressure. Not having witnessed any experiment of this process, we are unable to state any thing like an average of the time required to effect the object, and the patentee is perfectly silent upon that point in his specification; it is, however, said to be an extremely eligible as

well as expeditious mode of operating, and will of course become an important auxiliary to that branch of art.

The patentee states in conclusion, "it is not my intention to claim under this patent, an extensive use of the frames, screw-bolts, pipes, or any other article of apparatus herein mentioned, or the use of any particular kind of tan liquor, or any mode or process of preparing, and of finishing skins or hides, save and except the application of the machine or engine herein described or set forth, or any imitation of them, for the purpose of causing the tan liquor or liquors to pass by filtration or percolation through the skins or hides. The apparatus herein described, for effecting this purpose, is such as I have employed with success, and consider upon the whole to be best; but particular local situations, or other circumstances, may render it expedient to change the shape of the frames, or their vertical position for some other; or to enclose between the middle frame, and either of the exterior ones, two or more skins or hides, instead of the single one as above mentioned."

[*Inrolled, October,* 1823.]

To GEORGE STEPHENSON, *of Long Benton, Northumberland, engineer, for certain Improvements in Steam Engines.*

[Sealed 21st March, 1822.]

THESE improvements are designed to effect a more perfect vacuum in the condenser and cylinder than has been obtained by any of the old modes of constructing the condensing apparatus. The contrivance is applicable to either a single or double engine on the Bolton and Watt's prin-

ciple, or to any other description of steam-engine where a condenser is employed. The construction and disposition of the parts are shewn in Plate XVI. fig. 5, in which *a* represents the cistern of cold water, with the condenser *b* placed within in it; *c* is the injection-cock, by which a jet of cold water is introduced into the condenser at every stroke or half stroke of the piston. By means of this jet the steam from the eduction-pipe of the engine, occupying the vessel, is instantly condensed; *d* is the air-pump, having a solid plunger *e*, worked by a rod *f*, attached to the beam of the engine. There is a hanging valve 1, at the top of the air-pump, and another, 2, at bottom, by which the communication between the condenser and air-pump is opened or closed; 3 is a similar valve opening into the hot-well *g*; 4 is a loose wooden cover upon the top of the air-pump, acting as a valve whence the air and vapour above the plunger are discharged into the hot-well *h*. The pipe *i*, which communicates between the condenser and air-pump, extends a little distance up into the condenser, for the purpose of causing a small portion of water from the condensation to flow through the valve 1, on to the top of the plunger, for the purpose of making the packing round the plunger perfectly air-tight.

The operation of this improved condensing apparatus will be understood by the following explanation: Suppose the steam from the eduction-pipe to occupy the condenser *b*, a jet of cold water, thrown in by the cock *c*, will cause the greater part of the steam instantly to condense, when the water thus formed will descend to the lower part of the pipe *i*; supposing at this moment the plunger to be at the bottom of the air-pump, in rising it will produce a partial vacuum below it, which will cause the valve 2 to open, when the water will flow out of the pipe *i*, into the air-pump, and stand at a level in both. The descent of the plunger will cause the valve 2 to close, and the valve 3 to open, by

which means the water, which passed into the air-pump, will now be forced into the hot-well, and thus be drawn off from the condenser. The descent of the plunger *e*, producing a partial vacuum in the upper part of the air-pump, will cause the valve 1, to open, and the air and vapour remaining in the condenser to escape into the air-pump. The ascent of the plunger will cause the valve 1 again to close, the vapour that occupied the upper part of the pump will be expelled through the valve 4, into the hot-well *h*.

The design of this arrangement arises from a consideration that the gravity of the water, produced by the condensation, will cause it to descend to the bottom of the vessel, and the levity of the air and vapour will cause it to ascend to the top; now as the air and vapour cannot be drawn off through the water, it follows, that all that portion of the air and the steam which was not condensed by reason of the suddenness of the operation remains in the condenser and cylinder, and thereby tends to impede the desired object—a tolerably perfect exhaustion. The mode, therefore, proposed by the patentee, of drawing off the water below, and the air and vapour above, by distinct apertures and into distinct vessels, is considered to remove this imperfection, to which all engines are subject, and to cause the operation of exhaustion to be effected in a manner much nearer approaching to a perfect vacuum.

[*Inrolled, May,* 1822.]

To George Holdsworthy Palmer, *of the Royal Mint, engineer, for certain Improvements in the production of Heat by the application of well known Principles not hitherto made use of in the Construction of Furnaces of Steam-Engines, and of Air Furnaces in general; whereby a considerable Saving in the expenditure of Fuel is obtained, and the total consumption of Smoke may be effected.*

[Sealed February 12th, 1822.]

This invention is a blowing-machine acting by hydrostatic pressure; it is also capable of being employed as an exhausting-machine or air-pump, in which capacities it is intended either to inject a current of air into the furnance of a steam-engine, or to exhaust the further part of the flue, and thereby cause the atmospheric air to rush through the fire with considerable force.

The machine is said to consist of the three following particulars, which are claimed as new, in reference to the objects of the patent: first, a cast or wrought-iron tank, or case, of a cylindrical form, enclosing the blower; secondly, the revolving wheel, or box with air-passages; and thirdly, the bent tubes or pipes which conduct the air to the furnace. Plate XVI. fig. 6, represents a section of the machine placed alongside of the boiler of a steam-engine; *a a a*, is the tank or external vessel about three parts occupied with water; within this is a revolving wheel or chamber *b b b*, also partially occupied with water; and *c c c* are three curved tubes for conducting air to the interior of the revolving chamber; *d*, is a short pipe, by which air is admitted to the upper part of the tank, and *e* is the pipe by which the air is conducted from the chamber to the blowing-pipe *f f*. This pipe leads into a box *g*, placed under the furnace, which extends under the fire-place, and its open-

ing at top is contracted, so as to direct the current of wind between the bars of the grate into the fire.

The wheel is made to revolve within the tank by hand, or by any other suitable means, in the direction of the arrow, when it is designed to produce a blast. The air contained within the curved tubes *c*, will, as the wheel revolves, be expelled by the water and forced into the inner chamber, from whence as it accumulates, it will be impelled along the blowing-pipe *f*, to the box *g*, and thence through the fire. If the wheel be made to revolve in a contrary direction the air will be extracted, and if this operation be preferred, the pipe *f*, must lead to the hinder part of the furnace, where an exhaustion of the air would cause a current from the atmosphere to pass rapidly through the fire and produce the effect of blowing by that means.

The manner by which the air passes from the curved tubes to the interior of the chamber, and thence to the blowing-pipe, is not clearly described, but may be tolerably well conceived, as the apparatus and the operation seems to bear a very close resemblance to Malam's Gas Meter, described in Vol. XXXVII. of the Society of Arts' Transactions, and his rotatory steam-engine, described in our first volume, page 92.

The employment of a blast, obtained in this way, to the furnaces of steam-boilers and other furnaces in general, is considered to be capable of producing an entire ignition of the smoke and other vapours, and a total combustion of the fuel with an increased intensity of heat, and other advantages; which will economise the consumption of the fuel required to emit a certain quantity of heat, and thereby effect a very considerable saving in the expenditure attendent on working a steam-engine.

[*Inrolled August,* 1822.]

To JACOB PERKINS, *of Fleet-street, in the City of London, Engineer, for Improvements in the Mode of Heating, Boiling, and Evaporating by Steam, of Fluids, in Pans, Boilers, or other Vessels.*

[Sealed 17th May, 1823.]

THIS Patent appears to embrace every mode of applying the heat of steam, as generated from water confined under pressure, to the purposes of heating, boiling, and evaporating of fluids. Though no distinct application of the steam is mentioned in the specification, as not intending to confine it to particular objects, yet it is extremely obvious that the patentee contemplates using it instead of furnaces, for the boiling of a variety of matters, as fat for tallow-chandlers and soap-makers; also, for the evaporation of the aqueous parts in the preparation of sugar and salt, as well as a variety of other purposes, to which it seems applicable, considering that steam thus produced, may be passed through tubes at a very high temperature, and will not be likely to subject the materials operated upon to the danger of burning.

The specification opens with a reference to a former patent granted to the same inventor, and dated the 10th of December, in the third year of the reign of his present Majesty (see the present Vol. of this Journal, page 1,) "for certain improvements in Steam-Engines." In this reference the *generator* is mentioned as a part of the apparatus employed, but not claimed under the present patent. This invention is stated to consist of "pipes, hollow cylinders, or other the like apparatus, projected from such generator into fluids." These pipes or tubes are to be filled with steam from the generator, in the manner described in the former

specification, and the heat of the steam, thus produced, passing through the metal of the pipes or tubes to the surrounding fluid in which they are immersed, is to cause the boiling or heating of the fluid, for the purpose of throwing off or evaporating the aqueous parts.

The apparatus is to be so arranged with valves and forcing-pump, as to return the water produced by the condensation of the steam into the generator, from whence it emanated. The apparatus is also to be so constructed that the steam and water may be always under mechanical pressure. In order to explain the manner in which these objects may be carried into effect, the patentee has exhibited drawings of a generator with pipes extending therefrom and passing through a boiler, pan, or other vessel, with suitable valves and forcing-pump adapted to the object.

Plate XVI. Fig. 1, is a vertical section of an apparatus, upon this principle, in which *a* is the generator filled with water under pressure; *b*, a forcing pump; *c c c*, is a bent pipe or hollow tube, extending from the generator, and passing through a pan or boiler, occupied with a fluid to be boiled or evaporated, which is more clearly seen in the plan or horizontal view. Fig. 2. *d*, is a continuation of the end of the pipe *c*, after it has quitted the pan or boiler, whence it is carried on to the forcing-pump.

A portion of water, heated to a very high temperature, being permitted to escape through a valve from the generator into the pipe *c*, as described in the former specification; this heated water instantly becomes steam, and fills the pipe *c*; but the surrounding fluid contained in the pan or boiler, by abstracting the heat of the steam, causes it to condense and run-down to the valve *e*. When the piston of the forcing-pump is raised, the valve *e* slides back and the water flows from the pipe *c* into the pipe *d*; the valve *f*, which occupies

the pipe leading to the generator remaining closed by the pressure of the water within the cylinder; when the piston of the forcing pump is depressed, the valve *e* closes, and the water being thus prevented from returning into the pipe *c*, opens the valve *f*, and is forced into the generator.

The dimensions of the apparatus are not limited, but the proportion of the generator to the pipes and valves, as shewn in the figure, are considered to be eligible. The specification concludes by saying, "Such an apparatus as herein-before described, for heating, boiling, or evaporating of steam by fluid, in pans, boilers or other vessels, which said apparatus doth consist, as far as I claim any novelty therein, of pipes, valves, and a forcing-pump, arranged as aforesaid, being to the best of my knowledge and belief, entirely new, and never before practised in these kingdoms. I do hereby declare this to be my specification of the same."

[*Inrolled, November*, 1823.]

The experiments to which the Engine lately constructed was to be subjected, have not yet taken place, as we understand that Mr. Perkins does not think proper to submit the whole of his plans to public view, until he has inrolled the specification of his third patent, which will be done on the Fifth of December. Immediately after this, therefore, the public may be made acquainted with the whole detail of the Engine and the effect of its operation. We therefore postpone our remarks, observing that Mr. P's. private experiments are stated to be of the most flattering and satisfactory character.

To Richard Ormrod, *of Manchester, Lancashire, Iron Founder, in consequence of a Communication made to him, by a certain Person residing Abroad, for an Improvement in the Mode of Heating Liquids in Boilers, and thereby accelerating and increasing the production of Steam.*

[Sealed 7th January, 1822.]

The design of this invention, is to increase the effect of the furnace of a steam-engine, by extending the surface of the boiler, which is done by placing several tubes and other chambers filled with water either in the flues or on the sides of the fire place, all of which tubes or chambers open into the boiler. Plate XVI. fig. 7, shews a section of this construction of boiler, and its tubes; *a*, is the fire-place or furnace, from whence the flame, smoke, and heated vapour passes through a narrow passage into the flues *b b b*, and thence entirely round the boiler *c*, until at length the vapour and unconsumed smoke discharges itself into the chimney.

The boiler is supplied with water from the cistern *d*, the valve of which is opened by means of a lever and rod. A wooden float *e*, swims upon the surface of the water within the boiler, and when the evaporation of the steam has rendered a fresh supply of water requisite, the descent of the float *e*, draws down the rod and lever *f*, which raises the valve within the cistern *d*, and enables the water to flow down the feed-pipe *g*, into the transverse tube *h*. From this transverse tube the water passes into the chambers *i*, which form the sides of the fire-place, and from the chambers *i*, through the bent tube *k*, into the boiler. From the chambers *i*, the water also flows into the transverse-tube *l*, and thence along the tube *m*, and up the bent tube *n*, into the boiler.

The advantages of this disposition of the water tubes, and

chambers connected to the boiler, are that the fire may not extend itself uselessly on the brickwork of the furnace, but exert its power in heating the water before it enters the boiler. The water in descending the feed-pipe *g*, passes into that tube which is most powerfully acted upon by the fire in the furnace, and thence proceeding through other tubes, in immediate contact with the furnace, and along the tube *m*, which is enveloped in the flame, passes into the boiler at so high a temperature, that the generating of the steam will not be for a moment suspended, though cold-water is continually flowing in to supply the boiler.

The patentee states that he does not claim the mode of feeding the boiler here described, neither does he claim the tubes employed, except in their particular arrangement, as set out in the above explanation. The plan however seems so closely to resemble others already in use, that we do not discover the novelty or peculiar advantage which the patentee contemplates. (See Brown's Boiler, Vol. IV. page 68.)

[*Inrolled, July*, 1822.]

To Louis Bernard Rabaut, *of Skinner-Street, Snow-Hill, in the City of London, Gentleman, for an improved Apparatus for the Preparation of Coffee or Tea.*

[Sealed 26th June, 1822.]

This apparatus is a close vessel, of any convenient form, containing water, under which a lamp is to be placed for the purpose of keeping the water boiling. Into this vessel a tube is introduced, leading from the under side of the receptacle, above the vessel, which receptacle contains the tea

or coffee. By the pressure of the steam produced within the close vessel in boiling, the water is forced up the tube, and by insinuating itself into, and penetrating through the tea or coffee, the extract is obtained; which runs off by a spout into any convenient vessel placed under it as a receiver.

Plate XVII. Fig. 1. is a section of the improved apparatus, by which its internal construction will be seen: *a*, is the close vessel, about three parts occupied with water; under this is a spirit lamp, which causes the water to boil. The top of the vessel is closed by a steam-tight lid, which is attached to the lower part, and held securely by bayonet fastenings. The receptacle *b*, into which the tea or coffee, in a pulverized state is to be introduced, is united to this lid by solder or otherwise. The bottom of this receptacle is perforated with holes, through which the water forced up the tube *c* passes: *d*, is a plate, also perforated with holes, which is introduced into the receptacle *b*, for the purpose of pressing upon the tea or coffee *e*: a screw *f*, passes through the cover of the receptacle, which cover is made fast to the receptacle in a similar manner to the top of the closed vessel above described.

In using this apparatus, the grating or perforated bottom of the receptacle *b*, is first to be covered with a piece of blotting paper, then the tea or ground coffee is to be introduced as *e*, upon this another piece of blotting paper is placed, and then the plate *d*, the upper lid being at the same time affixed. The cover of the close vessel with the receptacle above it is then to be attached, as shewn in the Figure, with its tube extending almost to the bottom of the vessel. Boiling water is now to be poured into the close vessel at an aperture *g* in the lid. When the vessel is about three-fourths full, the stop cock *g*, must be closed, and the lamp at bottom lighted. The water being thus kept boiling in

the close vessel *a*, the steam which is not permitted to escape will exert considerable force upon its surface, and by that means the water will be forced up the tube *c* into the receptacle *b*, having in its progress insinuated itself through the perforated plate, and through the portion of tea or coffee *e*, at the lower part of the receptacle.

In order to draw off the extract the screw *f* must be turned round, which causes the plate *d* to descend and press upon the tea or coffee, by which means the extract oozes through the blotting paper, and through the holes of the plate *d*, into the upper part of the receptacle, from whence it runs off by the spout *h* into a vessel below.

[*Inrolled, December*, 1822.]

To James Delveau, *of Wardour Street, in the Parish of St. Anne, Soho, in the County of Middlesex, Musical Instrument Maker, for an Invention of an Improvement on Harps.*

[Sealed 24th April, 1822.]

The objects of this improvement are to obtain a greater length of sounding board to a harp than can be done by the ordinary modes of constructing them, and also to effect a more perfect connection between the pillar and the pedestal of the harp than has hitherto been found practicable.

Plate XVII. Fig. 2. exhibits a side view of a harp upon the improved construction, and Fig. 3. is a front view of the same; *a*, is the pillar of the harp, made in the usual manner at the upper part where it joins the neck, but at the lower part it is supported by two scrolls resembling a lyre, as seen at *bb* Fig. 3. These scrolls or branches, however, may be made in a variety of fanciful forms, agreeable to the taste of the manufacturer, the object being to connect the upper

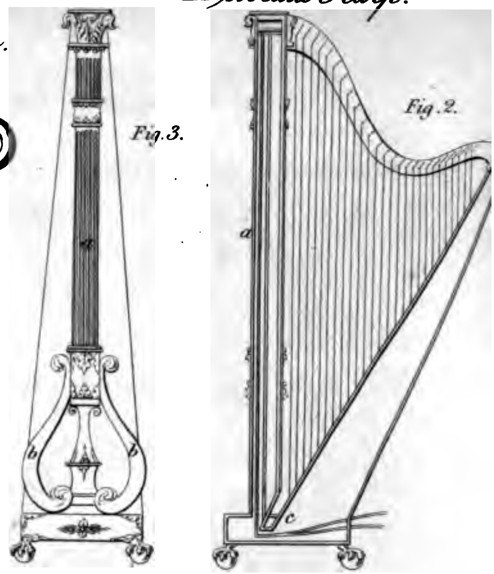
part firmly to the pillar, and to unite them at bottom to the pedestal, so as to preserve a broad base; the mode of fastening the parts together being by means of small wood pins or dowels.

The pillar is hollow throughout, in order to allow of the leading rods to proceed from the pedals up to the mechanism contained in the neck, for the purpose of producing the semi-tones, as in the ordinary construction of harps; this however is not claimed by the patentee as any part of his invention, and being well understood by those who are acquainted with the modern construction of harps, is not considered to require explanation.

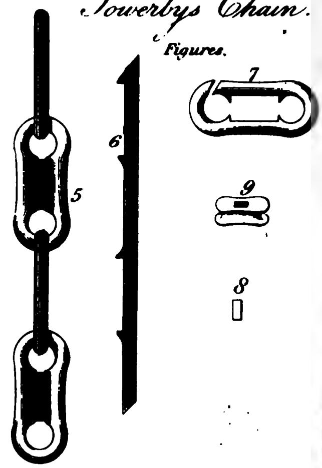
The sounding-board is made of deal, as in the ordinary construction, having two slips of hard wood glued along its centre, for the purpose of receiving the small pegs which secure the lower extremities of the strings. This sounding-board proceeds some distance below the surface of the pedestal (hollowed for that purpose) as may be seen at *c*, Fig. 2. instead of terminating at the level of the pedestal as usual. By this improvement a greater degree of elasticity is obtained than can be produced by the usual construction of sounding-boards, in consequence of its extending several inches below the peg, or suspension point of the lowest or base string, and the pedestal being hollowed out, does not touch the sounding-board in the middle, but only at the edges, it is thereby enabled to vibrate below the base string.

The patentee particularly states that he does not claim any particular construction or arrangement of the pedals, or any improvements in the movements to effect the shortening of the strings for the production of semi-tones; but confines his claims of invention simply to the new mode of making the bottom part of the pedestal of the harp and the branches, or the divided parts of the pillar, as described above. [*Inrolled, June*, 1822.]

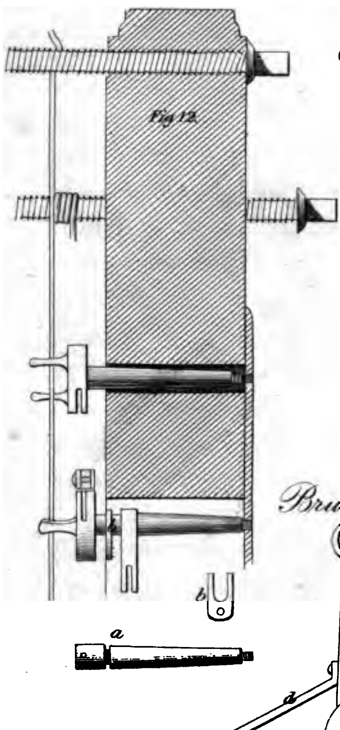
Delveau's Harp.

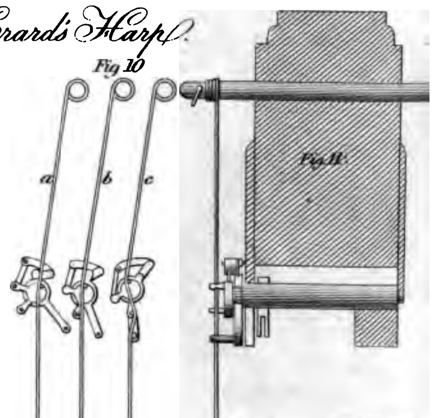


Sowerby's Chain.



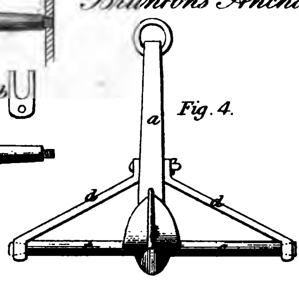
Erard's Harp.

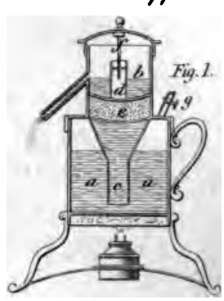




Rabaut's Coffee Po

Brunton's Anchor.





W Newton del.

J. Bellin sculp

To Thomas Sowerby, *of Bishops-Wearmouth, in the County of Durham, Merchant, for a Chain upon a new and improved principle, suitable for Ships' Cables, and other purposes.*

[Sealed 29th August, 1822.]

This chain is designed to sustain very great tension, and is formed with links supported by a stay of a novel kind. The appearance of the chain when complete is shewn in Plate XVII. Fig. 5; and the process of making it is as follows:—

Bars or rods of iron, of any convenient length, are rolled to a suitable diameter, with small projections on the side, as shewn by the piece of a rod Fig. 6, cut off the length required for making one link. This piece is to be bent round into the form shewn at Fig. 7, and then welded so as to produce a link. A small piece of malleable iron, as Fig. 8, is then heated to a welding temperature, and immediately introduced into the hole of the cast-iron stay, Fig. 9. The stay is then placed in the middle of the link between the small projections, and having heated the link also to a welding temperature, the sides of the link are beaten together, and brought in contact with the piece of malleable iron, which by that means adheres to the link, and fixes the stay firmly in its place.

The stay, it will be seen, is hollowed or grooved all round, in order to afford play to the links, and avoid any sharp edges. When one link is formed in this manner, another similarly constructed link may be joined to it by welding in the usual way, and thus a chain of any required length may be made.

The advantages of this peculiarly constructed chain are, that it will be more compact in proportion to its substance and strength, than any of the other constructions of chain cable, consequently more easy to handle, and will pass more readily through the hawse-hole. This link will also be found to be capable of supporting greater tension than any other description of link, and of holding its stay in a manner that precludes the possibility of its falling out of the link, or of the link collapsing, it being impossible for the stay to give way without the cohesion of the cast-iron being first crushed, and equally so of the malleable link being split asunder by the stay, which, on the contrary, tends to support it.

[*Inrolled, October*, 1822.]

To THOMAS BRUNTON, *of the Commercial Road, Middlesex, Chain Cable and Anchor Manufacturer, for his Improvement upon the Anchor, which he conceives will be of public utility.*

[Sealed 12th February, 1822.]

THE anchor here proposed has its stock introduced at the crown part, for the purpose of turning it over into a holding position. The shank is perforated through the solid in two places, with elliptical apertures, for the purpose of giving it a greater stability, and more effectually resisting the strain to which the anchor may be subjected. The stock is a cylindrical iron rod, held at its extremities by lateral braces, which are bolted to the shank.

Plate XVII. Fig. 4, shews the form of the anchor; *a*, is the shank; *b*, one of the flukes projecting forward in

this view; *cc*, the iron stock; and *dd*, the braces. The ends of the stock from the shoulder are formed dove-tailed and oval in the vertical direction, and are protruded through apertures in the braces, also oval, but in the horizontal direction, and counter-sunk. When the ends of the stock have been thus introduced through the holes, the braces are securely bolted to the shank, the ends of the stock are then spread by hammering into the counter-sunk holes of the braces, and by that means they are made firm.

An anchor of this description is considered by the patentee to possess considerable advantage, particularly in point of stability, over the ordinary construction of anchor, and is economical, inasmuch as a less weight of metal will give, upon this plan, an equal degree of strength.

[*Inrolled, August*, 1822.]

To Pierre Erard, *of Great Marlborough Street, in the County of Middlesex, Musical Instrument Maker, for Communications made to him by a certain Foreigner residing abroad, and discoveries by himself of certain Improvements on Harps.*

[Sealed 24th April, 1822.]

The improvements upon harps made by M. Sebastion Erard, and for which he obtained several patents in this country, have stamped a character of excellence upon the modern instrument to which it formerly possessed but little claim. The present patent of his relative Mr. Pierre Erard, is only for partial improvements upon Sebastion

Erard's harp, tending towards the completion of that invention as a perfect musical instrument.

The first object proposed is strengthening the neck of the harp, in doing which a new mechanical arrangement of the stops connected with the treble strings becomes necessary. The plan of this contrivance is shewn in Plate XVII. fig. 10. *a* is one of the treble strings from which the note would be flat; *b*, is the same at a natural pitch, and *c*, the same rendered sharp. The mode by which the tension of the string is effected will be clearly seen by the figure, in which compound levers, connected to a centre disc, cause a series of pins, acting like forks, to press against the strings and draw them with different degrees of tension, so as to produce the required tone. The action of this disc and compound levers, is produced by the pedals much in the ordinary way, by leading rods and cranks. The length of the arm which carries the lower pin precludes the possibility of the string jarring on striking the natural note, which used to be the case when the upper and lower stops turned on different centres. Fig. 11, is a transverse section of the neck of the harp upon the improved plan, by which it will be seen that the wood may be brought down on a level with the lower edge of the back plate, at the treble end of the instrument, and the strength of that part of the harp thereby considerably increased.

Fig. 12, is a section to shew an improved manner of attaching and fixing the main arbours to prevent their shaking. A groove is turned round the arbour, as at *a*, and into this groove a plate or forked piece of metal, as *b*, is inserted, which being screwed again to the front plate, holds the arbour firmly in its place. There is also another mode of effecting this proposed, but which is only a slight varia-

tion of the same sort of contrivance. The rest pins are proposed to be made cylindrical, with a worm round them, but the edges made sharp and the groove formed to the size of the string, by which means the string will be uniformly coiled upon the rest pin and prevented from laying against the front brass plate.

An index or indicator is proposed to be placed upon the pillar of the harp, for the purpose of shewing the particular key in which the harp is performing. This indicator is formed by moveable pieces of ivory, on which the flats, naturals, and sharps are represented; they are moved by sliders connected to the pedals, and are arranged to shift their positions according to the key in which the instrument is played. The situation of this indicator is facing the performer, upon the pillar, in order that it may be seen, but it is necessary, for the purpose of working the sliders of this indicator, to alter the arrangement of the pedals.

There is a contrivance for bringing a stop in contact with the sounding-board to prevent its vibration, which stop is in the bottom of the harp, and may be brought into play when required by a pedal attached to it. A contrivance is also proposed to relieve the performer from supporting the weight of the harp when in an inclined position: this is by means of sliding arms which draw out of the bottom of the harp, and are intended to rest upon the floor and sustain it.

[*Inrolled, October*, 1822.]

To Henry Colebank, *of Broughton in Furness, in the Parish of Kirkley Ireleth, in the County of Lancaster, Tallow-chandler, for a new and useful Engine, lately constructed by the Deponent, and now in his possession, for the purpose of cutting, twisting, and spreading Wicks used in the making of Candles, by which a great saving of manual labour is accomplished.*

[Sealed, 4th June, 1822.]

This is a machine by means of which a series of cotton-threads for candle-wicks may be arranged in such a manner, that any number of the said threads will be properly doubled, and spread on to wick-rods, at suitable distances: they are also cut to uniform lengths, and twisted equally. These operations are performed to all the threads at the same time, and by that means they are brought into a state fit for candle-wicks. The apparatus is placed in a box, in front of which the operator sits. A reel extends across the box at the hinder part, upon which the cotton-threads have been previously wound: from this reel they are drawn off in proper lengths, doubled, and cut by the following means:—

The several threads intended to form one wick are collectively passed through a guide (of which guides there are a series formed in a rack), from whence they proceed through a little hole (of which also there are a series) in a carriage that traverses backwards and forwards. After passing through the holes of this carriage, the ends of cotton are held fast by being pressed against the side of a fixed cutting-blade which extends across the machine.

The threads of cotton being thus disposed, and their ends held fast, a wick-rod of the usual kind is passed un-

der the threads by the operator, who holding the rod by its extremities, lifts it by both hands, and draws the threads off the reels, and thus brings them double to the front of the machine, where the rod is held fast by two pins. The cotton-thread now lies upon a flat board covered with cloth, upon which another similar board falls down, pressing the cotton-threads between them. A winch in front of the machine now being turned, causes the two boards last mentioned to slide laterally in different directions, by which operation the threads pinched between them become slightly twisted.

At this time a lever bar in front of the carriage abovementioned, falls down and holds the threads, while a moving cutting-blade descends, as one chap of a pair of shears, and cuts the lengths of cotton off against the fixed cutting-blade, which has been above described as holding them. The threads of cotton being now properly arranged upon the rod, doubled, twisted, and cut to the desired length, the pressing-board is raised, and the rod with its wicks removed ready to be dipped in the fluid tallow, as is the usual operation of making candles.

To obtain a second row of wicks, the carriage beforementioned is to be advanced a short distance by means of a treadle and cord, which will bring the ends of the cotton into a situation where they will be taken hold of and pressed against the side of the fixed cutting-blade, as before described; here the threads will be held while the rod introduced under them is brought forward with the threads doubled, the twist given, and the ends cut off as above described.

[*Inrolled, July*, 1822.]

NOTICE TO THE PUBLIC.

We have reported in this and the preceding volumes, the specification of every patent inrolled during the year 1822. On examining the list of patents it will be perceived that two are not noticed. From some cause the patentees have, in these instances, not inrolled the specification, and consequently having neglected to fulfil their engagement to the public, these patents have become void.

Original Communications.

On forming an Institution for the Cultivation of Mechanical Science.

To the Editor of the London Journal of Arts, &c.

Sir,

In laying before you agreeable to my promise,* the enclosed hints for the formation of an Institution of Mechanics, it is necessary that I should offer some apology for their imperfect arrangement. The memorandums that I had made of my ideas as they occurred, from the want of time and my own more immediate occupations, I have found it impracticable to correct, or to transcribe, half of them in any order of perspicuity. I had frequently also indulged in ideas somewhat visionary, which would have required for completion buildings of considerable magnitude; the expunging of these also has much increased the confusion.

I have felt considerably gratified with the notice already taken of the first suggestion, and should a single hint be found in the enclosed detail worthy of acceptation, I shall

* See page 197.

feel proud in having endeavoured to fulfil my duty, by laying it at your disposal. However, from what I hear, an attempt is making to form a "London Mechanics' Institute," and I find that the conduct of it is likely to be in such able hands, that any feeble addition that it would be in my power to offer, is rendered unnecessary. With my very sincere wishes however for the success of your endeavours to promote such an useful Institution, I beg to submit the following hints towards the final arrangement of the plan.

1. To communicate instruction to the working classes of mechanics in the different branches of the arts and sciences.

2. To afford to students in civil engineering, architecture, &c. greater facilities than at present exist of acquiring a theoretical knowledge of the elements and principles of the science or art which they are practising, and of successfully pursuing their appropriate studies to the attainment of eminence in their professions.

3. To assist in carrying into effect any useful projects that ingenious inventors may be unable to perfect, through pecuniary inability or too superficial a knowledge of the science of mechanics.

4. To edite, print, and publish any works upon subjects embraced by the views of the Institution, which might otherwise be lost through the obscurity of the author, or owing to pecuniary or other obstacles.

5. To carry on certain experiments tending to elucidate such theories as are at present obscure and [illegible], and to improve and extend others that may be p[illegible] l.

6. Generally to promote the exten[illegible] practical knowledge by proper incitements to [illegible], and by transmitting to posterity faithful recor[illegible] their proceedings, whereby they may be ma[illegible]

mark and correct errors, and make the path to be pursued the more obvious.

The first of these objects I find, by the letter of "a Mechanic," in the last Journal of Arts, has already been successfully pursued by our aspiring brethren in the North. Its utility is incalculable. The union of theory and practice was most strenuously urged by the immortal Bacon, and has been continually approved through all succeeding ages, but heretofore I believe, never adopted in the schools. On the conduct of this institution it is unnecessary to offer any suggestion, there being so many more competent to the task, and I doubt not, equally willing to undertake it. Of its utility the professed sceptic only can doubt, and I should conceive it not very difficult of formation. It is necessary of course that the instruction should be almost gratuitous.

The college for architects, &c. would undoubtedly be of inestimable benefit to the nation in general. If we review the facilities and stimulants at present afforded to students in these noble professions, they will be found, I fear, most lamentably few. At the universities the student in science passes an examination quite foreign to the subject to which his future views are directed, and, consequently, if he wishes to take his degree with credit to himself, he must devote no mean portion of his time and attention to the useless subject of that examination. It is natural that he should neglect that which leads to no honour, and equally so that he should ardently pursue what may place him in the light most pleasing to his friends and more generally shedding lustre upon himself. If studying under a private master, i. e. an individual of the profession, he meets no stimulus to excite him to excellence; his honour or dishonour is not public—he ranks in the world from the character of that master, and it becomes of but little consequence to a youth, regardless of the future, what attention he pays to his

studies; even more, unless blessed with a natural inclination for his intended profession, attention becomes an irksome task; fearing no examination that might expose him, and seeing no honour either to be lost or gained, it is fearfully neglected. How far different would be the result were he excited to emulation by the prospect of attaining honours that would be published to the whole world; by passing an examination which would proclaim to that world his pretensions to competency in his profession? How infinitely more beneficial would it be to the nation, and of how much greater advantage to himself, were the student to have nothing to divert his thoughts from the immediate objects of his pursuits. Every germ of genius would be fostered and nourished by the aliment the most congenial to it. Every spark would be roused by the exhilarating breath of emulation. Ambition is the most powerful and most predominant of the human passions; we have every day examples of its extension, and but too often its baneful influence over the human mind. Surely when such power is directed in so noble a path, we may expect something above ordinary productions.

By the third object it is proposed to rescue from oblivion useful discoveries, or to expose the fallacy of schemes that but too often prove of ruinous consequences to the uneducated but speculative mechanic. We have instances of genius perverted, of time and labour wasted in the pursuit of visionary projects, which have terminated in unprofitable patents; and it cannot be unfrequent that genius in humble life, shackled by poverty or theoretical difficulties, must fade unnoticed or exist unrewarded. The operative mechanic too, most frequently ignorant of the first principles of his immediate profession, must meet with many perplexing difficulties that he is unable either to solve or remedy. He has cer-

tain rules laid down for his work which he mechanically follows without in the least degree comprehending, and the first variation from them necessarily produces confusion the most perplexing. From this cause it is that we see improvements so ill received among the working class of society; for, unable to judge of any new introduction but by its effects, they are naturally unwilling to adopt it until it has been subjected to pretty general experience. How frequently do we see an expensive machine, professedly upon the best principle, performing but half its intended labour; and whence does this arise but from the blind path the constructor pursues. From his ignorance of a few of the first principles of his art, however exquisite the workmanship in itself may be, the production of his labours becomes nearly or even totally useless; the blame of this falls upon the machine not the mechanist, and consequently the first of inventions fall into disrepute.

How frequently must the operative mechanic find subjects for observation in the course of his labours, that can hardly meet the eye or occur to the philosopher in his study, and he is either totally, or with any degree of perspicuity, unable to express the result of those observations; and even should he endeavour to do so, his production, from its humble origin, would be neglected and unperused. Thus many valuable hints are lost to science, and it is thence we see, even in the present enlightened age, theory and practice but so ill accord. The society, by editing and patronizing such productions, would at once make them of value to the public and to the originator of the observations.

Experimental philosophy, although it has been more approved by each succeeding generation, has, as yet, only been practised by individuals; no body of men have yet united to concentrate their talents in one pursuit, and it is but reasonable to suppose that such an union would be im-

mensely more productive than the efforts of one solitary brain. We have seen the surprising effects produced by a single being when he has subjected his ideas to the test of experience, before he attempted to promulgate them; and we have also seen the fallacy of the schemes of powerful minds when unaided by this rudder to the understanding; genius wasted in wanton displays of baseless theories. A little reflection would shew the value of a society of liberal-minded men united in the pursuit of investigation; how comparatively rapid must be the advance of knowledge were they to meet at stated periods for the completion of the present half-digested theories; — theories that have hitherto frequently remained untouched for half a century, and then, perhaps, by the feeble hand of one individual only. But this prolix discussion must be tedious, for if the ideas have any merit, I intrust them to those who will be able to discover and appreciate them. Suffice it then, that I conceive that the union of the few hints here offered, with the coercion of the existing societies, might produce an institution of more really practicable benefit than any at present existing; for to the casual observer even of those societies, it must appear obvious that their internal improvement has not kept pace with the rapid advance of knowledge which they have so greatly induced.

I have hitherto confined myself to the mere principles of the projected institution, and on its internal regulations I am inadequate to offer many remarks, being sensible that a theory from the closet without any practical experience, but very rarely is of much avail. It may be well to suggest, however, that the college and school, the grand features of the plan, might be made considerable sources of emolument to the society. In the first, the students would, as in the universities, pay for board and lodging and a something for the instruction, and to the college. In the second, a certain

number of subscribers to the institute might be allowed, who would have admission to the *General Annual Meeting*, and access to a library and lectures, and be allowed votes to the college or school, in proportion to the amount of their subscription or donation. There might be a council of judges in addition to the ordinary officers, who would determine upon the merit of schemes, &c. offered to the society for approval and perfection; these should be elected annually from the members as in the Royal Society; viz. one half to be continued for the next year, and the other half to be newly elected, and thus alternately.

I have before mentioned that the members or fellows of the society might be made to undergo an examination previous to admission. It is obvious that this cannot be at the commencement of the plan. The society must have acquired strength and influence previously. The annual distribution of premiums to be somewhat after the plan of the Society of Arts, with this addition, that an exhibition be made at the time of the society's collection of models, those offered for and those receiving premiums; and to persons receiving pecuniary donations, a medal of inferior value to be given as a permanent record of the fact. The model room of the institution to be furnished with all European or Trans-Atlantic inventions that can be procured, but kept distinct from those of the society. The inventions perfected by the society to claim a premium as well as others. These inventions ought to be debarred the privilege of a patent, wherever it can be effected without injury to the inventor; but in such cases he must defray the expence attendant on its perfection, and allow a premium in proportion to its value to the treasury of the society; and in general a part at least of the expence must be refunded; since it is very evident that unreasonable funds would otherwise be requisite, or the society would be unable to effect many

valuable inventions, and would be presently ruined. The members or fellows to be subject to a fine for non-attendance at the meetings of the society, which might be monthly. But if the members become as numerous as could be wished for the welfare of the institution, this would become almost an impracticability. It would be, perhaps, better then to make a distinction between them, calling some (a proportion of about one-third of the number) fellows, and the others simply members. Fellows only to be obliged to attend all the meetings, and the members (unless honorary from residing out of the country) at the annual meeting.

The institution if perfected on this pl an, which could scarcely be hoped for many years, would require extensive offices. Two libraries, one particularly adapted to the college and to the society, the other of a more general description for the use of the subscribers; a laboratory well furnished with every requisite for experiments of all descriptions, model rooms, council chamber, &c. &c. But in the present, as we cannot hope to embrace every branch of science, it would be well to commence by confining its views to mechanics only. The funds might then most probably be raised with facility. The first expence entered upon should be a building appropriate to these views. It would give the society much greater influence, and consequently materially benefit it. It is much to be regretted that few of our societies have hitherto raised edifices for their own distinct use. When the Royal Society is mentioned, the first query of the foreigner is, Where is it? where is their mansion? the reply throws an icy coldness upon the ideas of the querist. Oh, they have none; their library is here, they meet there. We might almost as well say, their heads are in this place and their bodies in that. A small building only would be requisite at the outset; it

might be extended with the views and funds of the society.

I have omitted to observe that the *fellows* ought to be *compelled*, under forfeiture, to produce an annual "Paper" for the benefit of the institute. A printing-press (printing and engraving in all branches) would be an indispensable requisite, and would be economical for printing the transactions, &c. &c.; and the members, &c. might have the use of it, under certain restrictions, for any work within the objects of the society. It must certainly be incorporated by royal charter and possess a patron: I think the Duke of Gloucester a person very likely to take great interest in it, he being well skilled in the subjects it embraces.

These, Sir, are my crude ideas upon the subject of a MECHANICS' INSTITUTION, the existence of which, I hope, is not far distant; if from these hints any useful plans can be drawn, I shall feel great pleasure in having been thus of service to, (I may say, without fear of contradiction,) the most important class of society amongst us.

I am Sir.

Yours &c.

G. D. B.

Cambridge, Nov. 8th.

Portable Gas Lamps.

FEELING a certain degree of responsibility for every paper which is admitted into the London Journal of Arts, we take blame to ourselves for having permitted the paper signed "Prudentia" to be forwarded to the printer without revision. However, as it is now before the public in its crude state, we can only say that the general bearing of the matter, viz. the danger to be apprehended from portable gas

lamps is in perfect accordance with our own views of the subject. When we say this, we do not mean to adopt all the reasonings of our correspondent, who, whatever may be his proficiency in mechanical science, is certainly a novice in chemistry. In suggesting the enquiries, might not the sudden opening of a door admit a gust of wind which should drive the flame of the gas lamp inward, and produce explosion? he is suggesting an utter impossibility, in every sense of the word. Hydrogen gas is not capable of combustion, unless mixed with the oxygen of the atmosphere, and therefore if the flame could be directed inwards, it must be instantly extinguished.

We do not feel ourselves called upon at present to state our arguments upon the subject of danger, but surely when experimentalists of the first ability have not considered it safe to condense this gas in portable vessels beyond fifteen atmospheres, the danger which they apprehended must be considerably augmented by the company, who profess to serve it to their customers under a pressure of thirty atmospheres.

We have received a communication from Mr. Gordon upon the subject, which we willingly insert, but with all the faults of our correspondent, we will not permit him to be accused of private acrimonious feelings (which we understand has been imputed to him by Mr. G.). He declares he was perfectly ignorant of Mr. Gordon's identity with the Portable Gas Company, and has no personal knowledge of any individual belonging thereto; he merely, as he states, looked at the principle of compressing the gas, as it has been for several years practised by Mr. Brande and many other chemists, and knew not, (how should he?) that Mr. Gordon's patent-right had merged into a company, which is expressly contrary to the statute.

For our own part, we wish every one to be heard for him-

self, and therefore call the attention of our readers to Mr. Gordon's letter.—Ed.

Portable Gas Office.
7, Basinghall Street, 17th Nov. 1823.

To the Editor of the London Journal of Arts.

Sir,

My attention has been called to a letter in the last number of the London Journal of Arts and Sciences, signed "Prudentia."

How such a letter could find admission into any scientific publication, does excite my astonishment, as the contents appear to me either to proceed from extreme ignorance, or from a desire to impede the introduction of an invention by practising upon the credulity of the timid; and the style of the first paragraph I fear will justify the latter supposition.

Were Prudentia's letter to fall only into the hands of scientific readers, it would require no answer. But for the information of others, I take leave to make the following observations.

In my letter to Sir William Congreve, which was published in the Repertory for October last, I have shewn that the gas reservoirs used by the London Portable Gas Company cannot *possibly* be deteriorated by the continued pressure of the gas. That such strong vessels could be burst by a fall from a table is equally *impossible*. Even admitting that a greater fall might injure the reservoir, it could be only rent, as wrought iron and copper vessels when burst, do not fly in pieces, but rend like leather; and this could not *possibly* do any injury, as I have stated in some observations published in the Repertory for May, 1820.

In reply to Prudentia's fourth paragraph, I have to state that, no reservoir was ever burst while filling it with gas

at the London Portable Gas Company's works, but I suppose he alludes to an exaggerated report of what took place eighteen months ago at the Oil Gas works, at Old Ford. The directors had kindly permitted me to fix there a small set of pumps, and as I had not a proper proving pump, I therefore, with the requisite precautions, was *proving* a reservoir with gas, when it burst, and the sudden expansion of sixteen feet of gas, broke a number of panes of glass in the apartment. I was at the time, after my usual manner, standing within three or four feet of the reservoir, and one workman, who was standing on a bench directly over it, was so little affected that he continued to work the pump. Would any one refuse to use a fowling-piece, because Manton had burst one whilst proving it at his manufactory?

It is difficult with gravity to reply to Prudentia's last paragraph. Dr. Clarke's blow-pipe is filled with a mixture of hydrogen and oxygen. To make the carburetted hydrogen in a gas lamp explosive, it would be necessary to use a powerful pump to force in at least five times more common air, and then to ignite the mixtures would be still more difficult. To suppose that this could be effected by the sudden opening of a door is the extreme of absurdity.

I am, yours, &c.

DAVID GORDON.

On the New Mechanics' Institute.

To the Editor of the London Journal of Arts.

SIR,

BEING a reader of your interesting Journal, I feel disposed to trouble you with a few observations, on a subject which has for some time past occupied a considerable share of the

public attention; I mean the projected establishment of an Institution for the Improvement of Operative Mechanics.

Feeling a warm interest in any plan tending to better the condition of that useful class of men, my curiosity being excited by the advertisement with which the town was inundated, and personally knowing many of the parties who placed themselves in the foreground on this occasion, I was induced to attend the meeting at the Crown and Anchor; and never, certainly, was I more completely disgusted, than with the cant and nonsense which formed the principal ingredients of most of the orations of the evening. The observations of the Chairman were at once simple and dignified; not disgraced by the *fulsome adulation of labouring Mechanics which filled some of the speeches*, but judiciously adapted to the end in view, and in every respect worthy of the high character of Dr. Birkbeck. With this distinguished exception and some others, the proceedings of the meeting may be described in a few words: the speakers called the auditors "the staple prosperity of the country," and the latter gratefully acknowledged the justice of the assertion, by loud cheers:—"the mechanics of England were the saviours of Europe, during the last war," and stentorian plaudits echoed the assertion: they were "the pride of this empire, and the glory and envy of the world;" and pleased to discover in themselves so many great qualities, they hailed the orators with redoubled acclamations; and clapping of hands, and beating of hoofs, carried the glad tidings through the regions of space. Such we may say is *invariably* the character of an English public meeting. The newspapers have taken up the subject with a warmth of zeal, that has a prospective reference to advertisements at *five guineas the column;* and all this absurdity goes to the world as the effusions of humanity and public spirit. I do not mean to deny that in this instance, such

are the motives which have actuated many of the parties; but *there are some exceptions, which I could particularize, for thereby hangs more than one tale.*

But my object in writing this, is not the views of the parties to whom I am alluding, nor even the proceedings of the meeting, which are interesting only in their results. Those results are not yet developed, but they may be foreseen on an impartial consideration of the question. You may recollect, Mr. Editor, how the torch of discord was thrown amongst the meeting by one whose name is too well known to need mentioning; and though it was quenched for the moment by the good sense and prudence of the Chairman, yet there are those who will not fail to re-kindle it in the first favourable hour. When that person advised the mechanics to take the infant institution into their own hands, he guided them to the rock upon which, I have no hesitation to say, they are finally to be wrecked; for to suppose that his advice on this point will not be ultimately followed, is to give labouring mechanics greater credit for modesty and disinterestedness than is due to their more enlightened fellow creatures. The institution, it appears to me, will go on to a certain point, and then receive a fatal check; and this opinion is the well-weighed result of both observation and experience. Whilst it possesses the charm of novelty it will flourish, and the claims of the pot-house and the skittle ground be in abeyance; but zeal is a perishable commodity; enthusiasm of this species is a fire, which must be kept up by public meetings, clap-trap letters and speeches, and bank notes; this fuel will be exhausted, and the institution placed between the horns of the following dilemma. Either the patrons will continue to superintend the Society, to the dissatisfaction of the members, for I cannot believe they will be entirely exempt from these petty vanities and prejudices, which sprout up so luxuriantly in all

public societies, or they will transfer its management to persons unfitted for the task both by habits of life and education. I say nothing of the weariness which persons of limited means will soon feel at the quarterly or yearly visits of the society's collector: that is a consideration too ignoble to be admitted into the calculation of its projectors.

These are mortifying facts, Mr. Editor, but *they are facts*, and they render the pleasing theory of an Institution for the Enlightenment of Mechanics like one of those prospects, which, all beauty and splendour in the distance, yet on our nearer approach melt into the deformity of nature.

But let us take a view of this subject through what I should call the light of common-sense. Suppose the object of the patrons accomplished, and the institution established;--what practical good will accrue? Will persons in the condition of life of the members of the Mechanics' Institute quit avocations which must feed them, and relinquish their, in general, brutifying amusements for intellectual pursuits? And if they do so, will they be improved by studies, which from their very nature must appear dry and incomprehensible to *tyros from the forge and the lathe?*

"A little learning is a dangerous thing."

A superficial knowledge of the principles of science will lead men, destined to fill humble stations, to be vain, self-sufficient and discontented,—to doubt of all things and disbelieve the most important. Even make them perfect philosophers—Newtons, Lockes, Watts', and T. G—s: Can such an *esprit du corps* be excited among them as to nip the growth of those animosities and jealousies, which so fatally prevent many of the best institutions from forwarding the interests of science? What have any associated body of men, *as a body*, ever done worth remembering in the arts?

What great invention, of ancient or modern times, has originated or been perfected by a society? On the contrary, have we not seen one institution collecting grubs and butterflies; another forbidding the publication of its proceedings by its own members, and the *elite* of a third, talking of *soldering sheet iron, and making one lamp illuminate two persons?* And, finally, is not the prospect of the public patronage for any useful invention the best of all stimulants to mechanical genius? *

I am aware that many of the doctrines which I have endeavoured to advocate in this letter will be pronounced illiberal, intolerant, and unjust; but the abuse which will be heaped upon them will be any thing but controverting my arguments. Perhaps, Sir, your own opinions may run counter to them; but I feel persuaded that you will not, on that account, refuse them a place in your Journal; for if my positions be untenable, they possess a stronger claim on your notice, as their insertion may give some more intelligent correspondent an opportunity of refuting them, and reclaiming from such obstinate errors,

Your obedient servant and reader,

T. H.

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* To your Journal belongs the credit of suggesting the establishment of an institution to assist humble genius with the funds necessary for the completion of any invention of merit sufficient to bear the test of examination. This really useful design appears to be overlooked by the projectors of the Mechanics' Institute.

Novel Inventions.

Cooling Worts, &c.

Mr. Bundy, of Fulham, whose inventive genius has long been known to the public, is upon the point of completing a refrigerating apparatus upon a novel construction, by which he expects to be enabled to cool worts and other liquors, in a few minutes, to any desired degree of temperature, from the boiling point to that of cold water.

His process is to pass the boiling liquor into a main trunk or pipe, from whence it proceeds through lateral pipes into branches, something like the arteries and veins of the human frame; the series of which gradually diminish in their diameter. These are inclosed in a vessel filled with water, which is continually flowing over at top. At the lower part of the vessel the branches and pipes collect again into one main trunk, and thence proceed, if the cooling is to be carried on still farther, into another series of pipes and branches immersed in a second vessel of water, and so on through a third and fourth series if required. The water which occupies the vessel containing the pipes at the lowest temperature of the refrigerating process, flows into the next vessel, and so on to that which contains the pipes at the commencement.

We understand that the apparatus, as arranged by Mr. Bundy, has met with decided approbation by some of the first brewers in the metropolis, and will very shortly be before the public. Mr. B. has obtained a patent for this invention, and in due time we shall give the details publicity

New Patents Sealed, 1823.

To John Ranking, of New Bond Street, in the city of Westminster, and county of Middlesex, Esq. for his invention of a means of securing valuable property in mail and other stage coaches, travelling carriages, waggons, caravans and other similar public and private vehicles, from robbery. —Sealed 1st November—2 months, for Inrollment.

To George Hawkes, of Lucas Place, Commercial Road, in the parish of Stepney Old Town, in the county of Middlesex, ship builder, for his invention of an improvement in the construction of ship anchors.—Sealed 1st November—6 months.

To George Hawkes, of Lucas Place, Commercial Road, in the parish of Stepney Old Town, in the county of Middlesex, ship builder, for his invention of certain improvements on capstans.—Sealed 1st November—6 months.

To William Bundy, of Fulham, in the county of Middlesex, mathematical instrument maker, for his invention of an anti-evaporating cooler to facilitate and regulate the refrigerating of worts or wash in all seasons of the year, from any degree of heat between boiling and the temperature required for fermenting.—Sealed 1st November 6 months.

To Thomas Foster Gimson, of Tiverton, in the county of Devon, gentleman, in consequence of communications made to him by a certain person residing abroad, and of discoveries made by himself, for an invention of various improvements in, and additions to, machinery now in use for doubling and twisting cotton, silk, and other fibrous substances.—Sealed 6th November—6 months.

To Thomas Gowan, of Fleet Street, in the city of London, truss manufacturer, for his invention of certain improvements on Trusses.—Sealed 11th November—2 months.

To John Day, of Barnstaple, in the county of Devon, Esq. for his invention of certain improvements on percussion gun-locks, applicable to various descriptions of fire arms.—Sealed 13th November—2 months.

To John Ward, of Grove Road, Mile End Road, in the county of Middlesex, ironfounder, for his invention of certain improvements in the construction of locks and other fastenings.—Sealed 13th November—2 months.

To Samuel Savill, of Browns Hill, in the parish of Bisley, in the county of Gloucester, clothier, for his invention

of a new mode or improvement for dressing of woollen or other cloths.—Sealed 13th November—2 months.

To Richard Green, of Lisle Street, in the parish of Saint Anne, in the county of Middlesex, saddler's ironmonger, for his having invented certain improvements in constructing gambadoes, or mud boots, and attaching spurs thereto, and part of which said improvements are also applicable to other boots.—Sealed 13th November—2 months.

To Robert Stein, of the Tower Brewery, Tower Hill, in the city of London, brewer, for his invention of an improved construction of blast furnace, and certain apparatus to be connected therewith, which is adapted to burn or consume fuel in a more economical and useful manner than has been hitherto practised.—Sealed 13th November—6 months.

To Joseph Gillman, of Newgate Street, in the city of London, silk warehouseman, and John Hewston Wilson, of Manchester, in the county of Lancaster, silk and cotton manufacturer, for their invention of certain improvements in the manufacture of hats and bonnets.—Sealed 18th November—6 months.

To John Heathcoat, of Tiverton, in the county of Devon, lace manufacturer, for his invention of a machine for the manufacture of platted substance composed either of silk, cotton or other thread or yarn.—Sealed 20th November.—6 months.

To Thomas Hopper, of Reading, in the county of Berks, Esq. for his invention of certain improvements in the manufacture of silk hats.—Sealed 2d November.—6 months.

To Charles Anthony Deane, of Charles Street, Deptford, in the county of Kent, ship caulker, for his invention of apparatus or machines to be worn by persons entering rooms or other places filled with smoke or other vapour, for the purpose of extinguishing fire, or extricating persons or property therein.—Sealed 20th November.—6 months.

To Jacob Perkins, of Fleet Street, in the city of London, and John Martineau the younger, of the City Road, in the county of Middlesex, engineers, for their invention of improvements in the construction of the furnaces of steam-boilers, and other vessels, by which fuel is economized, and the smoke is consumed.—Sealed 20th November.—6 months.

D.	H.	M.	S.	
1	[illegible]	[illegible]	[illegible]	☿ in its descending node long. [illegible]
1	12	4	1	☾ in conj. with ☿ long. [illegible] Dif. dec. [illegible] ☾ [illegible] S. ☿ [illegible] S.
2	[illegible]	[illegible]	21	Ecliptic Conjunction ● New Moon.
3	[illegible]	[illegible]	[illegible]	♃'s 1st Sat. eclipsed.
4	12	23	0	☽ in conj. with ♅ long. 9s [illegible] Dif. dec. [illegible] ☽ [illegible] S. ♅ [illegible] S.
5	10	[illegible]	10	♃'s 1st Sat. eclipsed.
5	11	[illegible]	16	♃'s 2nd Sat. eclipsed.
6	0	0	0	☽ in Apogee.
7	9	25	10	♃'s 3rd Sat. eclipsed.
7	12	27	1	♃'s 3rd Sat. will emerge from his shadow.
10	6	49	0	☽ First quarter.
10	17	54	29	♃'s 1st Sat. eclipsed
11	0	0	0	☿ in Aphelion.
12	12	22	55	♃'s 1st Sat. eclipsed.
12	14	17	29	♃'s 2d Sat. eclipsed.
12	21	24	0	☉ in super. conj. with ☿
14	6	51	23	♃'s 1st Sat. eclipsed.
14	13	23	55	♃'s 3rd Sat. eclipsed.
14	16	26	39	♃'s 3rd Sat. will emerge from his shadow.
17	9	46	0	Ecliptic opposition ☉ Full moon.
18	0	0	0	☾ in Perigee.
18	5	11	0	☾ in conj. with ♃ long. 3s 7° 20′. Dif. dec. 1° 21′ ☾ 24° 30′ N. ♃ 23° 9′ N.
19	0	0	0	♀ at her greatest elongation. 7s 10° 0′
19	0	0	0	♀ in Perihelion.
21	[illegible]	[illegible]	[illegible]	♃'s 1st Sat. eclipsed
21	[illegible]	[illegible]	[illegible]	♃'s 2nd Sat. eclipsed
22	[illegible]	[illegible]	0	[illegible] in quadrature [illegible]
22	[illegible]	[illegible]	[illegible]	♃'s 1st Sat. eclipsed.
21	[illegible]	[illegible]	[illegible]	♃'s 3rd Sat. eclipsed.
22	[illegible]	[illegible]	[illegible]	[illegible] enters ♑
23	[illegible]	[illegible]	[illegible]	[illegible]
23	6	12	32	♃'s 1st Sat. eclipsed
23	22	14	0	☾ in conj. with ♂ long. [illegible] Dif. dec. [illegible]
24	1	18	0	☾ in quadrature entering the last quarter.
26	16	10	46	♃'s 1st Sat. eclipsed
25	17	37	0	☾ in conj. with ♀. long. [illegible] Dif. dec. [illegible]
28	0	17	0	☉ in opposition to [illegible].
28	10	30	18	♃'s 1st Sat. eclipsed
29	3	14	0	☾ in conj. with [illegible] long. [illegible] Dif. dec. [illegible]
30	7	10	46	♃'s 1st Sat. will emerge from his shadow.
30	11	34	33	♃'s 2nd Sat. will emerge from his shadow.
31	0	0	0*	☉ Eclipsed, invisible at Greenwich, long. at the time of conj. [illegible] ☾'s lat. 0° 47′ 50″ N.
31	20	10	0	Ecliptic Conjunction ● New Moon
31	23	20	0	☽ in conj. with ♅ long. 9s 11° [illegible] Dif. dec. [illegible] ♅ [illegible] N. ☽ [illegible] N

N.B. All the above calculations are made to mean or clock time.
The waxing moon ☽—the waning moon ☾.

* There are Five Eclipses of the Sun this year, but none of them central in any part of the world.

METEOROLOGICAL JOURNAL, Oct. and Nov. 1823.

1823.	Thermo. Higt.	Thermo. Low.	Barometer. +	Barometer. —	Rain in inches.	1823.	Thermo. Higt.	Thermo. Low.	Barometer. +	Barometer. —	Rain in inches.
Octr.						Nov.					
27	55°	33	30,16	30,03	. .	10	45°	29°	30,48	30,35	. .
28	54	45	29,79	29,49	. .	11	45	28	+ ,48	— ,47	. .
29	49	38	+ ,60	— ,51	,025	12	36	25	,41	— ,30	. .
30	45	39	,20	— ,05	,35	13	41	21	,30	— ,29	. .
31	43	37	,05	— ,03	1275	14	45	26	,24	— ,10	. .
Nov.						15	51	43	,25	— ,11	. .
1	46	37	,84	— ,60	,25	16	51	35	,30	— ,28	. .
2	43	28	30,03	— ,96	. .	17	41	32	,26	— ,24	. .
3	52	25	29,90	— ,76	. .	18	50	35	,29	— ,20	. .
4	52	46	+ ,60	— ,49	. .	19	47	39	,10	— ,04	. .
5	50	37	. .	— ,58	, 3	20	51	39	29,98	29,95	. .
6	55	43	,86	— ,83	, 3	21	51	35	30,07	— ,99	. .
7	54	47	,89	. .	,45	22	50	42	29,91	— ,86	. .
8	51	45	30,19	30,05	, 2	23	49	40	+ ,93	— ,88	. .
9	43	33	+ ,30	— ,24	. .	24	52	41	30,02	29,95	. .
						25	53			30,—	. .

Lower Edmonton. C. H. A[illegible]

SOME time in the course of the ensuing month will be published an Introduction to the study of the Anatomy of the Human body, for the use of Artists, translated from the German of J. H. Lavater, and illustrated by numerous plates.

Mr. Riddle, Mathematical Master at the Royal Naval Asylum, is preparing for the press a Treatise on Navigation and Nautical Astronomy, adapted to practice and the purposes of elementary instruction.

Mr. Pursglove, sen. is about to publish a Guide to Practical Farriery, containing hints on the diseases of horses and neat cattle, with numerous valuable recipes.

A new, easy and concise system of Short-hand, founded on philosophical principles, and applicable to any language, is in the press.

Mr. Dick is preparing for publication an Essay on the general diffusion of knowledge by means of Education and Associations: a prolific and interesting subject if well handled.

M. Chaptal, the French Chemist, has just published a work on Chemistry, as applied to Agriculture, which we should be glad to see translated. We may say the same of a Treatise on Practical Mechanics, by M. Christian, which gives a luminous and well-arranged exposé of that valuable science, deduced from observation and experience.

ROMAN CEMENT—M. Berthier, the eminent French Chemist, has lately analyzed the Roman Cement of Messrs. Parker and Wyatt, of London. He gives its component parts as follows

Carbonate of Lime	,657
——— Magnesia	,005
——— Iron	,070
——— Manganese	,019
Clay Silica	,180
—— Alumina	,066
Water	,013
	1,000

Bertheir thinks, that with one part of common clay and two and a half of chalk, a very good hydraulic lime might be made, which would set as speedily as the English one. From numerous experiments which he has made on the subject, he has drawn the following conclusions:—A limestone containing six parts in the hundred of clay, affords a lime perceptibly hydraulic. Lime from fifteen to twenty per cent is very hydraulic; and when from twenty-five to thirty, it sets almost instantly, and may therefore be considered as Roman Cement.

THENARD'S BLUE.—The following is the formula for the preparation of this beautiful substance. Make a solution of nitrate of Cobalt, by roasting the cobalt ore, digesting it in diluted nitric-acid, evaporating the solution to dryness, and dissolving the residue in water. Phosphate of soda is to be added, and the powder which is thrown down, well washed in water, and when still moist, mixed with eight times its weight of alumina, prepared by the addition of ammonia to a solution of alum; the alumina must be used before it is dry. The compound is then spread on thin plates, dried in a stove, and reduced to fine powder, which is afterwards exposed to a red heat in a covered crucible for half an hour.

BRAZILIAN DIAMOND —The matrix, or original repository of this valuable stone, appears from several diamonds in their native state, which are in the cabinets of various mineralogists, is *brown iron ore* which is found in beds of slaty quartzose micaceous iron ore, or in beds composed of iron glance and magnetic iron ore.

Mr. W. Belsham will shortly publish the Ninth and Tenth volumes of his Memoirs of George the Third.

Mr. E. Walker has now in the press a volume of Philosophical Essays, embracing great part of the modern discoveries and improvements, with the outlines of chemical philosophy.

LONDON:
SHACKELL AND ARROWSMITH, JOHNSON'S-COURT, FLEET-STREET.

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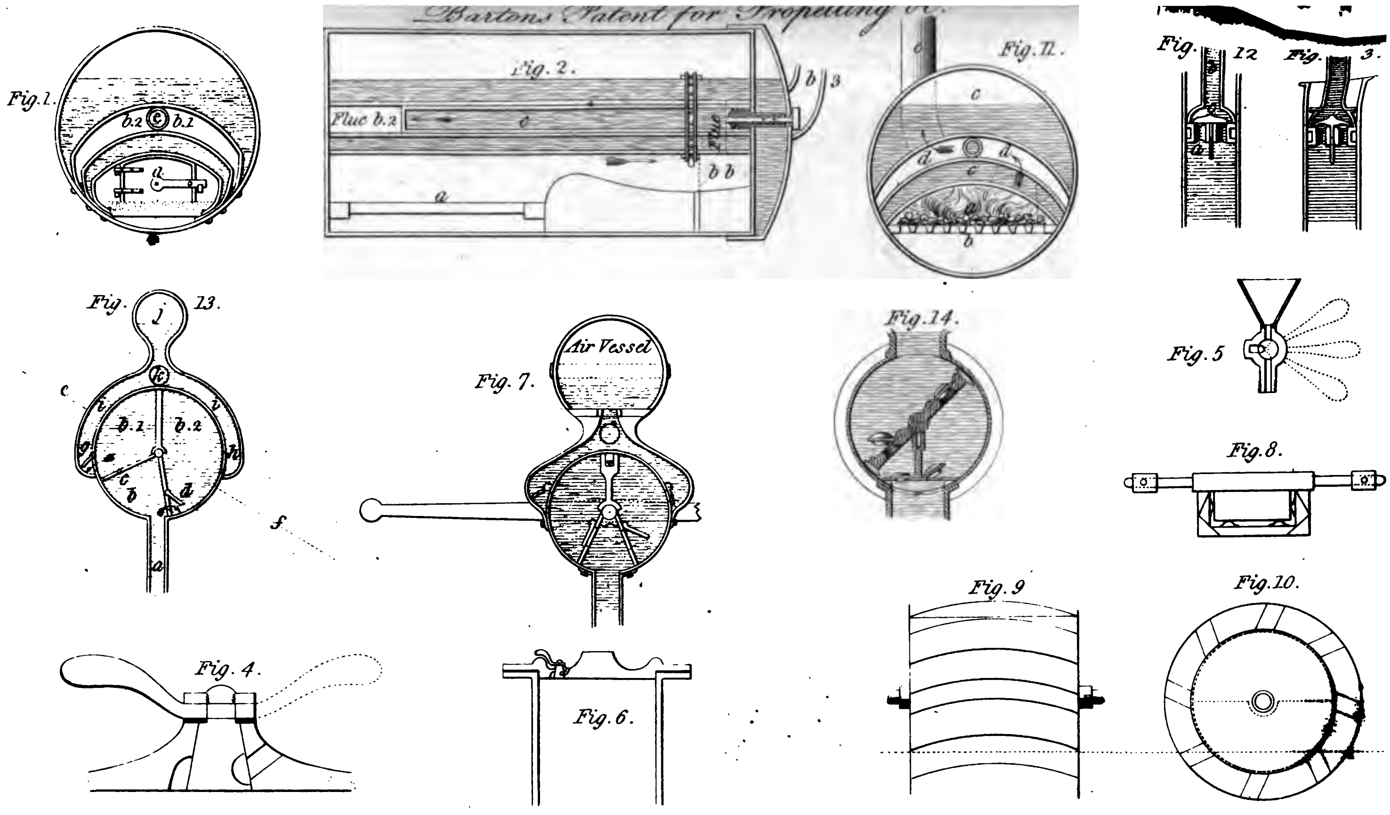

W. Newton, del.t S. Bellin sculp.t